BUFFALO
SEWER AUTHORITY

SPDES Permit No. NY0028410

Long Term Control Plan Semi-Annual Status Report
Reporting Period: *January through June 2019*

Amended Administrative Order
CWA-02-2014-3033
(Amends CWA-02-2012-3024)

September 2019

Long Term Control Plan Semi-Annual Status Report

Table of Contents

ATTACHMENT:

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 Semi-Annual Status Reports to the USEPA and NYSDEC by September 1st for current year January 1– June 30 reporting period, and March 1st for the previous calendar year July 1 – December 31 reporting period. The AO requires that the following be provided in each Semi-Annual Status Report:

- The project milestones, deadlines and other terms that the Authority is required to meet since the date of the last Semi-Annual Status Report, whether and to what extent the Authority has met those requirements, and the reason for any anticipated delays and/or noncompliance.
- A general description of the work completed during the reporting period and the applicability of the work to meet indicated design criteria, as well as the projection of work to be performed during the next reporting period and any anticipated delays for the upcoming work. Any changes in key personnel must also be noted.
- Enclosure of public meeting (if held) materials including: advertisements, handouts, formal meeting notes, and a summary of the meeting (see Attachment C).
- Copies (to USEPA only) of all monthly monitoring reports or other reports pertaining to combined sewer overflows (CSOs) and bypasses that Authority submitted to the NYSDEC during the reporting period. Please note DMRs are now submitted electronically directly to the USEPA and no dry weather overflows occurred during this period, so this item does not apply during this reporting period.

This report covers January through June 2019 which serves as Semi-Annual Report No. 11.

2. REQUIREMENTS DUE IN REPORTING PERIOD

Attachment A provides the current status of all projects listed in the Administrative Order. Issues with implementing these projects are detailed in Section 4 of this document.

This document serves as the September 1, 2019 semi-annual report.

Certificates of Acceptance and Occupancy for fully completed projects for this reporting period are included in Attachment D.

3. WORK COMPLETED IN CURRENT REPORTING PERIOD AND PROJECTION OF WORK TO BE PERFORMED NEXT REPORTING PERIOD

A general description of the work completed on LTCP projects during the current reporting period and the work projected to be performed during the next reporting period is provided in Attachment A. Items that have been completed have been highlighted orange.

A more detailed description of each project including the location and the goal to be achieved through each project is provided in Attachment B.

4. IMPLEMENTATION ISSUES

4.1 Hamburg Drain Optimizations

Preliminary design for the Hamburg Drain Optimizations was begun prior to January 1, 2014; however, detailed design was delayed due to high water levels in Lake Erie. As a result of this delay the March 18, 2016 Notice to Proceed deadline was exceeded. Updated deadline dates will be requested via formal request following additional modeling of this area. Design of the Mill Race In-Line Storage project has begun. Updated modeling of the Hamburg Drain area will be performed once the model calibration report is approved to evaluate options for this area.

4.2 WWTP Improvement Project Alternative C2

Design of this project has been delayed due to the presence of extensive quantities of grit that have accumulated in the system reducing WWTP capacity. Before further upgrades are considered, the existing issues must first be rectified to allow for accurate measurements of existing capacity. The cleaning of the A-side influent channels, aeration basin 3 and both the A-side and B-side effluent channels was completed in two separate contracts for the facility. Phase 1 removal of the grit in the secondary system included the removal and disposal of over 1,210 wet tons of grit. Phase 2 of the grit removal project continued with grit removal for the remaining influent and effluent channels and consisted of the removal of an additional 240 wet tons of grit.

The Authority worked with a consulting engineer to begin the next phase of removing grit from the aeration tanks in the secondary system, and issued bidding documents for the removal and associated tank isolation activities. The bids received ranged from $6.7 to $12.2 million, which are much higher figures than the Authority anticipated. After reviewing the bids and considering the costs solely of grit removal, the Authority determined that it would be more prudent to replace the entire 24-year old aeration system in order to ensure its longevity and to improve energy efficiency.

On June 28, 2019, the Authority submitted to USEPA and NYSDEC, for review, a revised schedule for completion of the WWTP Improvement Project, which includes replacement of the aeration system. Under this schedule, construction will start in November 2020 and be substantially complete by June 2027.

4.3 North Relief-Interceptor

Preliminary subsurface investigation in conjunction with the North Relief-Interceptor concept has revealed concerns with the location of bedrock and the feasibility of the proposed tunnel location. Due to the noted concerns, the Authority has phased the proposed project. The initial phase, the Bird Avenue Underflow Sewer Project has been completed. Engineering analysis for additional phases is currently focused on the implementation of real time control technology and short circuit methodologies with the intention of reducing the scale of a North Relief-Interceptor project.

5. CHANGES IN KEY PERSONNEL

Allison Lack has been appointed General Counsel effective January 2019.

6. PUBLIC MEETINGS

Presentations were given at the Greater Buffalo Environmental Conference (GBEC) in March 2019 on the Authority's Wet Weather Operational Optimization Program and Raincheck. A presentation regarding the status of the Authority's LTCP efforts was given to the Buffalo River Area of Concern Remedial Advisory Committee in June 2019. The slides used in all of the presentations are included in Attachment C.

7. MODEL MODIFICATIONS

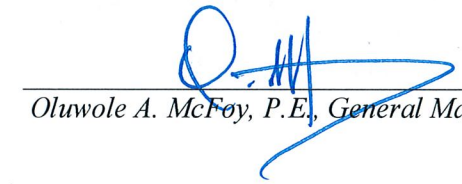
The final Model Calibration Report was submitted in January 2019.

8. GREEN INFRASTRUCTURE

The Rain Check 2.0 Opportunity Report was published during the reporting period. The report can be viewed and downloaded at raincheckbuffalo.org

9. 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."



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

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Date

Attachment A to the Semi-Annual Status Report: September 2019

Work Completed in Current Period/ Projection of Work to be Performed in Next Reporting Period

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Phase I Projects				
CSO 060 GI Project	---	---	Prior to 1/1/2014	Complete.
Bird/Lang RTC Projects	Construction Start	3/17/2014	2/24/2014	Complete
	Completion Date	9/2/2014	5/9/2016	Complete
	Operations/ Optimization (RTC)	9/3/2014 – 9/3/15	10/1/2016	Complete
Bird RTC Project	Construction Start	3/17/2014	2/24/2014	Complete
	Completion Date	9/2/2014	5/6/2016	Complete
	Operations/ Optimization (RTC)	9/3/2014 – 9/3/15	10/1/2016	Complete
Lang RTC Project	Construction Start	3/17/2014	2/24/2014	Complete
	Completion Date	9/2/2014	5/9/2016	Complete
	Operations/ Optimization (RTC)	9/3/2014 – 9/3/15	10/1/2016	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Foundation Projects				
Foundation 1 - Smith Street Storage	Engineering Start	3/18/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	6/10/2015	Complete
	Notice to Proceed	3/18/2015		Complete
	Substantial Completion	3/18/2017	10/9/2017	Complete
CSO No. 026 Sewer Separation	Engineering Start	3/18/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	4/3/2015	Complete
	Notice to Proceed	3/18/2015	7/8/2015	Complete
	Substantial Completion	3/18/2017	6/22/2016	Complete
CSO No. 026 RTC Structure	Engineering Start	3/18/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	6/10/2015	Complete
	Notice to Proceed	3/18/2015	7/13/2016	Complete
	Substantial Completion	3/18/2017	10/9/2017	Complete
Foundation 2 - SPP Optimization (20 projects)	Engineering Start	3/1/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	4/20/2015	Complete
	Notice to Proceed	3/1/2014	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017		
SPP 180 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/20/2015	Complete
	Notice to Proceed	---	9/8/2015	Complete
	Substantial Completion	3/18/2017	12/16/2015	Complete
SPP 331 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	4/20/2015	Complete
	Notice to Proceed	---	9/8/2015	Complete
	Substantial Completion	3/18/2017	12/16/2015	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
SPP 036 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	1/20/2014	Complete
	Notice to Proceed	---	5/30/2014	Complete
	Substantial Completion	3/18/2017	8/4/2014	Complete
SPP 217 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/3/2015	Complete
	Notice to Proceed	---	7/8/2015	Complete
	Substantial Completion	3/18/2017	12/21/2015	Complete
SPP 318 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/3/2015	Complete
	Notice to Proceed	---	7/8/2015	Complete
	Substantial Completion	3/18/2017	12/21/2015	Complete
SPP 097A Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/20/2015	Complete
	Notice to Proceed	---	9/8/2015	Complete
	Substantial Completion	3/18/2017	12/16/2015	Complete
SPP 122 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 163 Optimization	Engineering Start	---	3/1/2014	Complete
	Engineering Completion	---	11/25/2014	Complete
	Notice to Proceed	---	3/1/2015	Complete
	Substantial Completion	3/18/2017	8/6/2015	Complete
SPP 165 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
SPP 165A Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/4/2014	Complete
	Notice to Proceed	---	7/25/2014	Complete
	Substantial Completion	3/18/2017	11/3/2014	Complete
SPP 178 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 335B Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 336A Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/20/2015	Complete
	Notice to Proceed	---	9/8/2015	Complete
	Substantial Completion	3/18/2017	12/16/2015	Complete
SPP 341A Optimization	Engineering Start	---	1/1/2014	Complete
	Engineering Completion	---		This project is on hold pending the results of post-construction monitoring of Lang and Hazelwood RTCs.
	Notice to Proceed	---		
	Substantial Completion	3/18/2017		
SPP 342B Optimization	Engineering Start:	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 001 Optimization	Engineering Start:	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	3/27/2014	Complete
	Notice to Proceed	---	6/16/2014	Complete
	Substantial Completion	3/18/2017	12/12/2014	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
SPP 183 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 283 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 211 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
Foundation 3 - Remaining RTC (14 sites)	Engineering Start	3/18/2016	8/9/2016	Ongoing
	Notice to Proceed	3/18/2017		
	Engineering Completion	3/18/2023		
	Substantial Completion	3/18/2024		
Hertel Northwest In-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Hertel South (Hertel at Deer) In-Line Storage	Engineering Start	---	1/19/2018	Complete
	Engineering Completion	---	12/13/2018	Complete
	Notice to Proceed	---	2/9/2019	Complete
	Substantial Completion	3/18/2024		Expected to be complete during next reporting period
Hertel Northeast In-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Bird East In-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
East Ferry In-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Colorado In-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
North Bailey In-Line Storage	Engineering Start	---	12/8/2017	Complete
	Engineering Completion	---	6/5/2018	Complete
	Notice to Proceed	---	10/16/2018	Complete
	Substantial Completion	3/18/2024		Expected to be complete during next reporting period
South Bailey In-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Roslyn In-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Hazelwood (Kay) In-Line Storage	Engineering Start	---	8/9/2016	Complete
	Engineering Completion	---	9/22/2017	Complete
	Notice to Proceed	---	2/2/2018	Complete
	Substantial Completion	3/18/2024	6/19/2019	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Amherst Quarry Off-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Fillmore North In-Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Gibson CSO Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Montgomery CSO Line Storage	Engineering Start	---		
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Babcock Pump Station In-Line Storage	Engineering Start	---	6/19/2019	Complete
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Smith St. and Eagle St. In-Line Storage	Engineering Start	---	4/4/2019	Complete
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Broadway at Oak In-Line Storage	Engineering Start	---	4/4/2019	Complete
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Foundation 4 - Hamburg Drain Optimizations	Engineering Start	3/18/2015	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2017	2/23/2017	Complete
	Notice to Proceed	3/18/2016	5/16/2017	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
	Substantial Completion	3/18/2018		
Foundation 4 - Hamburg Drain Storage	Engineering Start	3/18/2028		
	Engineering Completion	3/18/2030		
	Notice to Proceed	3/18/2030		
	Substantial Completion	3/18/2032		
Mill Race In-Line Storage	Engineering Start	---	4/4/2019	Complete
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2032		
WWTP				
WWTP Improvement Project Alternative C2	Engineering Start	11/26/2019		See 4.2. As requested on Nov. 8, 2018, BSA submitted a written Request for Extension that reflects these amended dates. Completion dates are still under review.
	Engineering Completion	10/15/2024		
	Notice to Proceed	5/30/2022		
	Substantial Completion	6/30/2027		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Green Infrastructure Projects				
Green 1 - Pilot Projects – 267-acres of GI control SEE	Engineering Start	3/1/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2016		Complete
	Substantial Completion	3/18/2018	12/31/2016	Complete.
2001-2016 Residential (traditional) Demolitions	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	12/31/2016	Complete.
2001 - 2016 Commercial and Industrial Demolitions	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	12/31/2016	Complete.
Green 2 – 410 acres of GI Control	Engineering Start:	3/18/2019	Prior to 1/1/2014	Complete
	Engineering Completion:	3/18/2023		
	Substantial Completion:	3/18/2024		
2017 - 2024 Demolitions	Engineering Start		Prior to 1/1/2014	Complete.
	Engineering Completion:			
	Substantial Completion:	3/18/2018		
Green Demolition Pilot Project	Engineering Start		Prior to 1/1/2014	Complete
	Engineering Completion			Complete
	Substantial Completion		7/31/2017	Complete.
PUSH Blue Projects	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	7/1/2015	Complete.
Carlton Street Porous Asphalt	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	7/25/2014	Complete.
Fillmore Avenue Porous Parking and Green Lots	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	4/23/2015	Complete.
Ohio Street	Engineering Start	---	Prior to 1/1/2014	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	12/1/2014	Complete.
Kenmore Avenue	Engineering Start	---	4/30/2014	Complete
	Engineering Completion		4/20/2015	Complete
	Substantial Completion	3/18/2018	3/1/2017	Complete.
Genesee Street	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	6/8/2015	Complete
	Substantial Completion	3/18/2018	6/1/2017	Complete.
Allen Street	Engineering Start	---	Prior to 1/1/2014	Green infrastructre will no longer be implemented as part of the Allen Street streetscape project due to site constraints.
	Engineering Completion	---		
	Substantial Completion	3/18/2018		
Willert Park	Engineering Start	---	6/1/2016	Complete
	Engineering Completion	---	2/1/2017	Complete
	Substantial Completion	3/18/2018	4/26/2019	Complete
Northland Ave	Engineering Start	---	7/1/2016	Complete
	Engineering Completion	---	3/1/2017	Complete
	Substantial Completion	3/18/2018		
Niagara Street Phase 1: Elmwood Street to Virgina Street	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	3/19/2014	Complete
	Substantial Completion	3/18/2018	12/1/2016	Complete.
Niagara Street Phase 2: Virgina Street to Porter Avenue	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	6/3/2015	Complete
	Substantial Completion	3/18/2018	11/16/2017	Complete.
Niagara Street Phase 3: Hampshire Street to Scajaquada Expy	Engineering Start	---	10/28/2015	Complete
	Engineering Completion	---	3/21/2018	Complete
	Substantial Completion	3/18/2018		
Niagara Street Phase 4a:	Engineering Start	---	10/28/2015	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Phase 4a: Scajaquada Expy to Hertel Ave	Engineering Completion	---	6/13/2018	Complete
	Substantial Completion	3/18/2018		
Niagara Street Phase 4b: Hertel Ave to Ontario St	Engineering Start	---	10/28/2015	Complete
	Engineering Completion	---	6/13/2018	Complete
	Substantial Completion	3/18/2018		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Niagara Street Phase 5: Porter Avenue to Hampshire Street	Engineering Start	---	10/28/2015	Complete
	Engineering Completion	---		
	Substantial Completion	3/18/2018		
Green 3 – 375 acres of GI Control	Engineering Start:	3/18/2023		
	Engineering Completion:	3/18/2028		
	Substantial Completion:	3/18/2029		
Green 4 – 263 acres of GI Control	Engineering Start:	3/18/2028		
	Engineering Completion:	3/18/2033		
	Substantial Completion:	3/18/2034		
Gray Projects				
CSOs 014/15 – Erie Basin In-line storage and optimization projects	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	3/18/2014	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2015	12/29/2014	Complete
SPPs 206A&B	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	5/30/2014	Complete
	Substantial Completion	3/18/2015	12/29/2014	Complete
SPP 035	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2015	5/31/2014	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
SPP 036	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	5/30/2014	Complete
	Substantial Completion	3/18/2015	12/5/2014	Complete
CSO 013 – Satellite storage, conveyance, FM & PS	Engineering Start	1/1/2020		Deadline dates revised per April 30, 2019 letter. Engineering expected to start during the next reporting period.
	Engineering Completion	1/1/2021		
	Notice to Proceed	1/1/2021		
	Substantial Completion	1/1/2023		
North Relief – Interceptor	Engineering Start	3/18/2019	5/15/2015	Complete; See 4.3.
	Engineering Completion	3/18/2022		
	Notice to Proceed	3/18/2022		
	Substantial Completion	3/18/2026		
CSOs 010, 008/010, 061, 004 – Underflow capacity upsizing	Engineering Start	3/18/2021		
	Engineering Completion	3/18/2023		
	Notice to Proceed	3/18/2023		
	Substantial Completion	3/18/2024		
SPP 337 (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start	3/18/2023		
	Engineering Completion	3/18/2025		
	Notice to Proceed	3/18/2025		
	Substantial Completion	3/18/2027		
SPP 336A&B (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start	3/18/2024		
	Engineering Completion	3/18/2026		
	Notice to Proceed	3/18/2026		
	Substantial Completion	3/18/2029		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Jefferson Avenue & Florida Street (CSO 053) – Satellite storage, conveyance and FM	Engineering Start	3/18/2025		
	Engineering Completion	3/18/2027		
	Notice to Proceed	3/18/2027		
	Substantial Completion	3/18/2030		
CSO 055 – Satellite storage, conveyance, FM & PS	Engineering Start:	3/18/2027		
	Engineering Completion:	3/18/2030		
	Notice to Proceed:	3/18/2030		
	Substantial Completion:	3/18/2034		
CSOs 028/044/047 - Satellite storage, conveyance, FM & PS	Engineering Start:	3/18/2028		
	Engineering Completion:	3/18/2031		
	Notice to Proceed:	3/18/2031		
	Substantial Completion:	3/18/2034		
CSO 052 – Satellite storage, conveyance, FM & PS	Engineering Start:	3/18/2030		
	Engineering Completion:	3/18/2032		
	Notice to Proceed:	3/18/2032		
	Substantial Completion:	3/18/2034		
CSO 064 – Satellite storage, conveyance, FM & PS	Engineering Start:	3/18/2030		
	Engineering Completion:	3/18/2032		
	Notice to Proceed:	3/18/2032		
	Substantial Completion:	3/18/2034		

Attachment B to the Semi-Annual Status Report: September 2019

Detailed Project Descriptions

Project Name	Project Description	Project Purpose*
Phase I Projects		
CSO 060 GI Project	This project consisted of the construction of 4768 CF of rain garden on Windsor, Parkdale and Elmwood Avenues between Bird and Forest Avenues and 39,600 SF of permeable pavement on Clarendon and Claremont Avenues between Bird and Forest Avenues, installation of a Stormceptor unit at Bird Avenue and Granger Place and a total of 6,125 LF of 12-30 inch sewer designed to carry street flow to the existing storm overflow sewer on Forest Avenue from the above mentioned street segments. Additionally, weirs were raised in SPPs 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, and 240.	This project was designed to treat 13,600 cf of stormwater runoff from the 0.9 inch water quality storm event and remove 49.5 cfs of peak flow from the combined sewer system. Thereby reducing overflows through SPPs 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, and 241 to CSO 060. Together with other LTCP projects, this project is projected reduce CSO 060 discharges to Scajaquada Creek based on the 1993 Modified Typical Year (TY) to negligible activations and flow.
Bird/Lang RTC Projects	These RTC projects utilize available capacity of large sewers to provide flow control measures during wet weather events through the use of gates which allow continuous dry weather underflow.	
Bird RTC Project	The Bird RTC Project is located on Bird Avenue between Parkdale Avenue and Hoyt Street.	The Bird RTC project is designed to provide 1.01 MG of storage volume, thereby reducing discharges through SPP 013 to CSO 004. Together with other LTCP projects, this project is projected reduce CSO 004 discharges to the Black Rock Canal based on the TY to 3 activations.
Lang RTC Project	The Lang RTC Project is located on Lang Avenue between Courtland Avenue and Hagen Street.	The Lang RTC project is designed to have a storage volume of 0.84 MG, thereby reducing discharges through SPP 340 to CSO 053. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the 1993 Modified Typical Year (TY) to 4 activations.

Project Name	Project Description	Project Purpose*
Foundation Projects		
Foundation 1 - Smith Street Storage	Originally envisioned as a single project, these two projects have been separated to realize cost advantages due to the different levels of skill required for the projects and to expedite the sewer separation component.	
CSO No. 026 Sewer Separation	This project consisted of the installation of collection sewers for street receiver flows on Leddy Street, South Park Avenue, Owahn Place, Prenatt Street, Bolton Place, St. Stephen's Place, and Buffalo River Place, tributary to to SPP 88 and 90, in order to discharge these storm flows downstream of regulators, in conjuction with the optimization projects for SPP 217 and SPP 318.	Together with the Smith Street in-line storage project, the Smith Street partial sewer separation project is designed to divert storm flows directly to the Smith Street Drain thereby reducing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 6 activations or less.
CSO No. 026 RTC Structure	The second contract consists of an in-line storage project which is designed to detain wet weather flows along the western side of Smith Street using a weir structure between the I-190 and the I-190 off ramp within the Smith Street Drain for discharge to the South Interceptor thereby diverting combined sewer flows from CSO 026.	Together with the Smith Street partial sewer separation project, the Smith Street in-line storage project is designed to divert and detain the equivalent of a storage volume of 1.94 MG, thereby reducing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 6 activations or less.
Foundation 2 - SPP Optimization (20 projects)	Project consists of multiple smaller projects that will overlap in engineering and construction. SEE DETAILS FOLLOWING FOR SPECIFIC PROJECTS	In general, these projects will reduce discharges to the CSOs by detaining flows within the BSA's system through the modification of existing control structures.
SPP 180 Optimization	This project consisted of raising of the weir associated with SPP 180 by 2.0' along its entire length. SPP 180 is located on Delaware Avenue at the intersection with West Delavan. As part of the revised SPP 331 Optimization, this weir will be raised an additional 1.75' along its entire length.	The SPP 180 Optimization project was designed to increase the capacity of the CSS at SPP 180 thereby decreasing CSO 006 discharges. Together with other LTCP projects, this project is projected to reduce CSO 006 discharges to the Black Rock Canal based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
SPP 331 Optimization	SPP331 is located at the intersection of Elmwood Avenue and West Delavan Avenue. Preliminary plans were for the diversion of flows from this point through a new sewer to Bird Avenue along the centerline of Elmwood Avenue. This would have required major disruption of a very high traffic commercial area and was deemed impractical. Plans have been developed to instead divert the same flow that was to have been diverted through this project through a system of localized weir modifications rather than extensive pipe installation. These modifications include raising the weir at SPP 180 by 1.75' and the bench located in SPP 332 on the northeast quadrant of Gates Circle which currently directs dry weather flows into the interceptor will be removed and replaced with a 6.2' weir and restored sewer trough which will direct dry weather flows into the Bird Avenue trunk sewer.	The SPP 331 Optimization project is designed to increase the underflow capacity at SPP 331 thereby decreasing CSO 006 discharges. Together with other LTCP projects, this project is projected to reduce CSO 006 discharges to the Black Rock Canal based on the TY to 4 activations.
SPP 036 Optimization	This project consisted of the reconstruction of 35' of 30" sewer associated with SPP 036 to reverse the slope. It was located on Church Street between the off and on ramps of the Skyway (State Route 5).	The SPP 036 Optimization project was designed to increase the underflow capacity at SPP 036 thereby decreasing CSO 015 discharges. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Erie Basin through CSO 015 to 0 activations.
SPP 217 Optimization	In association with the Smith Street partial sewer separation project, this project consisted of the removal of two bottom orifice plates totaling 1.42' in height, increasing the orifice size and conveyance capacity of the Emslie Street Sewer. SPP 217 is located on Emslie Street at its intersection with Eagle Street.	The SPP 217 Optimization project is designed to increase the underflow capacity at SPP 217 thereby decreasing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.

Project Name	Project Description	Project Purpose*
SPP 318 Optimization	In association with the Smith Street partial sewer separation project, this project consisted of the removal of an orifice plate, increasing the orifice size and conveyance capacity of the Clinton Avenue Sewer. SPP 318 is located east of the intersection of Fillmore Avenue and Clinton Street.	The SPP 318 Optimization project is designed to increase the underflow capacity at SPP 318 thereby decreasing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.
SPP 097A Optimization	This project consisted of abandoning an inactive combined sewer, converting another to a storm sewer and abandoning the underflow connection. SPP 097A is located at the intersection of the extension of Prenatt and Orlando Streets.	The SPP 097A Optimization project is designed to eliminate SPP 097A thereby decreasing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.
SPP 122 Optimization	This project consisted of raising of the weir associated with SPP 122 by 0.5' along its entire length. SPP 122 is located on South Legion Drive just north of the intersection with Meriden Street.	The SPP 122 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 122 thereby decreasing CSO 037 discharges. Together with other LTCP projects, this project is projected to reduce CSO 037 discharges to the Buffalo River based on the TY to 3 activations.
SPP 163 Optimization	The SPP 163 Weir Optimization project consisted of replacing the existing weir with a new weir 0.75' higher. It is located to the East of the intersection of Fillmore Avenue and Northland on Northland Avenue.	The SPP 163 Optimization project is designed to increase the flow volume conveyed by the CSS at SPP 163 thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 165 Optimization	This project consisted of raising of the weir associated with SPP 165 by 0.5' along its entire length. SPP 165 is located on Fillmore Avenue just north of the intersection with East Delavan Street.	The SPP 165 Optimization project was designed to increase the capacity of the CSS at SPP 165 thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 165A Optimization	The weir associated with SPP 165A located at the intersections of Fillmore and Kensington Avenues.	The SPP 165A Optimization project was designed to increase the capacity of the CSS at SPP 165A by raising the weir by 0.75' and upsizing 675' of 15" pipe to 18” pipe to reduce CSOs in association with CSO 053. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
SPP 178 Optimization	This project consisted of raising of the weir associated with SPP 178 by 0.5' along its entire length. SPP 178 is located on Masten Avenue just north of the intersection with Northland Avenue.	The SPP 178 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 178 thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 335B Optimization	This project consisted of raising of the weir associated with SPP 335B by 1.0' along its entire length. SPP 335B is located on Hager Street just south of the intersection with Florida Street.	The SPP 335B Optimization project was designed to increase the flow volume conveyed by CSS at SPP 335B thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 336A Optimization	This project has been constructed in association with the SPP 331 optimization. The project consist sof removing a sluice gate and orifice plate and modifying the existing structure by changing the existing side channel opening from 24" to 30". SPP 336A is located on Humboldt Parkway North of the Scajaquada Drain.	The SPP 336A Optimization project is designed to increase the underflow capacity of the CSS at SPP 336A thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 341A Optimization	SPP 341A is located on Genesee Street east of Kerns Avenue. This project is on hold pending the results of post-construction monitoring of Lang and Hazelwood RTCs.	The SPP 341A Optimization project would increase the flow volume conveyed by the CSS at SPP 341A thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations. Field conditions may require modification to this planned optimization.
SPP 342B Optimization	This project consisted of raising of the weir associated with SPP 342B by 1.0' along its entire length. SPP 342B is located on Sprenger Avenue adjacent to Schiller Park.	The SPP 342B Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 342B thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
SPP 001 Optimization	The weir associated with SPP 001 located at the discharge of Cornelius Creek into the Niagara River and tributary to CSO 055 has been raised 1.0' to reduce CSOs.	The SPP 001 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 001 thereby decreasing CSO 055 discharges. Together with other LTCP projects, this project is projected to reduce CSO 055 discharges to the Niagara River based on the TY to 9 activations.
SPP 183 Optimization	This project consisted of raising of the weir associated with SPP 183 by 2.0' along its entire length. SPP 183 is located at the intersection of Bradley Avenue and Dewitt Street.	The SPP 183 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 183 thereby decreasing CSO 059 discharges. Together with other LTCP projects, this project is projected to reduce CSO 059 discharges to Scajaquada Creek based on the TY to 0 activations.
SPP 283 Optimization	SPP 283 is located in the median between the I-190 South ramp to Porter Avenue and a service road near the West Side Rowing Club. This project consisted of removing an orifice plate which restricted flows from entering the Swan Trunk and the installation of a new 1.0' tall weir to restrict flows from discharging through CSO 063.	The SPP 283 Optimization project was designed to increase the underflow capacity of the CSS at SPP 283 thereby decreasing CSO 063 discharges. Together with other LTCP projects, this project is projected to reduce CSO 063 discharges to the Niagara River based on the TY to 4 activations.
SPP 211 Optimization	This project consisted of constructing a weir to an elevation above the overflow raised pipe invert at SPP 211. SPP 211 is located at the South East corner of the intersection of Clinton and South Ogden Streets.	The SPP 211 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 211 thereby decreasing CSO 066 discharges. Together with other LTCP projects, this project is projected to reduce CSO 066 discharges to the Buffalo River based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
Foundation 3 - Remaining RTC (14 sites)	These RTC projects propose to utilize available capacity in the CSS to provide flow control measures during wet weather events through the use of active controls.	In general, these projects are designed to reduce discharges to the CSOs through the detention of flows within the BSA's CSS system.
Hertel Northwest In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is within the northern portion of the two large combined sewers which are located under Hertel Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 055 discharges to the Niagara River based on the TY to 9 activations.
Hertel South (Hertel at Deer) In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is within the southern portion of the two large combined sewers which are located under Hertel Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 055 discharges to the Niagara River based on the TY to 9 activations.
Hertel Northeast In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. This project will be located within the northern portion of the two large combined sewers which are located under Hertel Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 055 discharges to the Niagara River based on the TY to 9 activations.
Bird East In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. This project will be located to the east of the above mentioned Bird RTC project along the same Bird Avenue sewer.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 004 discharges to the Black Rock Canal based on the TY to 3 activations.

Project Name	Project Description	Project Purpose*
East Ferry In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is along the Ferry Street sewer upstream of its leaping weir overflow to the Scajaquada Drain north of Florida Street.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
Colorado In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is along the Colorado Avenue sewer which runs underneath the manufacturing facility located at 1001 East Delavan Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
North Bailey In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is along Bailey Avenue north of Scajaquada Street.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
South Bailey In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is along Bailey Avenue north of Scajaquada Street and south of the afore mentioned North Bailey In-Line Storage project.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
Roslyn In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is near Roslyn Street on Lang Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
Hazelwood (Kay) In-Line Storage	This RTC project, now known as Hazelwood, is proposed to utilize available capacity in the CSS capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is on Hazelwood Avenue between East Delavan and Easton Avenues.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
Amherst Quarry Off-Line Storage	This RTC project proposes to utilize available capacity within the active Amherst Quarry to provide flow control measures during wet weather events, once downstream capacity is available, flows will then be pumped back into the system. The Amherst Quarry is located in an area bounded by Parkridge Avenue, East Amherst Street, and Hewitt Avenue.	This RTC project is proposed to utilize available capacity of the quarry to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
Fillmore North In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. This project is proposed to be located on Fillmore Avenue, however pending the results of post-construction monitoring, it may be eliminated depending on the efficancy of the Smith Street Storage project.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.

Project Name	Project Description	Project Purpose*
Gibson CSO Line Storage	This project is proposed to utilize the available capacity of the CSO pipe downstream of the SPP, but before the discharge point or outfall. It would be designed to convey water to prevent surface flooding and overflows through upstream SPPs. Once the storm event has subsided, it would be designed to dewater back into the combined system. The dewatering rate would be controlled so that it would not cause overflows downstream from the control structure. The proposed project location is on Gibson Street, however pending the results of post-construction monitoring, it may be eliminated depending on the efficancy of the Smith Street Storage project.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.

Project Name	Project Description	Project Purpose*
Montgomery CSO Line Storage	This project is proposed to utilize the available capacity of the CSO pipe downstream of the SPP, but before the discharge point or outfall. It would be designed to convey water to prevent surface flooding and overflows through upstream SPPs. Once the storm event has subsided, it would be designed to dewater back into the combined system. The dewatering rate would be controlled so that it would not cause overflows downstream from the control structure. The proposed project location is along the railroad right-of-way near Montgomery Street, however pending the results of post-construction monitoring, it may be eliminated depending on the efficancy of the Smith Street Storage project.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.
Babcock Pump Station In-Line Storage	This RTC project is proposed to modify the function of an existing pump station to utilize available capacity of a large sewer to provide flow control measures during wet weather events. The proposed project location is at the existing pump staion on New Babcock Street at Howard Street.	This RTC project is proposed to utilize available capacity within the collection system to reduce the peak flow into the Swan Trunk. Together with other LTCP projects, this project is projected to reduce CSO 027 discharges to the Buffalo River based on the TY to 6 activations.
Smith at Eagle In-Line Storage	This RTC project is proposed to utilize available capacity in the Smith St Drain to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is upstream of the existing CSO 026 RTC project on Smith St. and Eagle St.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 6 activations.
Broadway at Oak In-Line Storage	This RTC project is proposed to utilize available capacity in the collection system to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is on Broadway St. at Oak St.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 017 discharges to the Buffalo River based on the TY to 6 activations.

Project Name	Project Description	Project Purpose*
Foundation 4 - Hamburg Drain Optimizations	This project will entail several in-system optimizations, e.g. rerouting of flows, installation of weirs, partial sewer separations etc. and/or green infrastructure to reduce the overflow events at a number of upstream SPPs in order to control flows through CSOs 017, 022, and 064. These optimizations would be located within the Hamburg Basin.	These optimization projects are proposed to increase the flow volume conveyed by the CSS upstream of the SPPs and diverting stormwater flows out of the CSS thereby decreasing CSO 017, 022, and 064 discharges. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Buffalo River through CSO 017 to 4 activations, CSO 022 to 5 activations, and CSO 064 to 3 activations.
Foundation 4 - Hamburg Drain Storage	Together with the Hamburg Drain Optimizations, this project would be designed to provide the equivalent of 5 MG of offline storage. This facility would be located within the Hamburg Basin and may involve the installation of RTCs.	This storage project is proposed to provide off-line storage thereby decreasing CSO 017, 022, and 064 discharges. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Buffalo River through CSO 017 to 4 activations, CSO 022 to 5 activations, and CSO 064 to 3 activations.
Mill Race In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is on Larkin Street near Roseville Street.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 017 discharges to the Buffalo River based on the TY to 6 activations.
WWTP		
WWTP Improvement Project Alternative C2	The proposed project is expected to rehabilitate the existing primary clarifiers by adding high rate disinfection and provide additional secondary clarifiers at the Bird Island WWTP.	This project would be designed to provide treatment of wet weather flows and increased secondary treatment capacity.

Project Name	Project Description	Project Purpose*
Green Infrastructure Projects		
Green 1 - Pilot Projects – 267-acres of GI control	Projects consist of multiple green infrastructure projects that will overlap in engineering and construction.	In general, this phase is designed to control stormwater flow from 267 acres of impervious area in the various sewer sheds within the targeted areas.
2001-2016 Residential Demolitions	This project consists of the demolition of vacant houses thereby replacing impervious with pervious surfaces.	This project is designed to remove 256 total acres of impervious area and manage stormwater on site.
2001-2016 Commercial and Industrial Demolitions	This project consists of the demolition of commercial and industrial structures thereby replacing impervious with pervious surfaces.	This project is designed to control stormwater flow from 78 total acres of impervious area.
Green 2 – 410 acres of GI Control	These projects will consist of multiple green infrastructure projects that will overlap in engineering and construction. Details will be provided in future reports.	In general, these projects would be designed to retain stormwater flow from 410 acres of impervious area in the various sewer sheds in the targeted areas.
2017 -2024 Demolitions	This project consists of the demolition of vacant and dilapidated structures thereby replacing impervious surface with pervious surface	This project is designed to control stormwater flow for each post demolition vacant lot. Total acreate TBD on a rolling basis depending upon demolitions completed.
Green Demolition Pilot Project	A three year pilot study where the City of Buffalo's demolition specifications were altered to allow for the use of shallow bioretention to increase onsite infiltration	Over the course of the pilot project the revised demolition specifications/bioretention approach was applied to 221 sites impacting a total of 19.03 acres.
PUSH Blue Projects	PUSH-Buffalo will install rain gardens, porous pavement and a green roof and distribute rain barrels within the CSO 012 sewershed.	This project is designed to control stormwater flow from 1 acre of impervious area.
Carlton Street Porous Asphalt	This project consisted of the installation of pervious pavement to retain stormwater from the area tributary to the Right-of-Way on Carlton Street between Michigan and Jefferson Avenues in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from a 5.9 acre sewershed.

Project Name	Project Description	Project Purpose*
Fillmore Avenue Porous Parking Lots and Green Lots	This project consisted of the installation of porous pavement parking lots and modified rain gardens to retain stormwater from the area tributary to the Right-of-Way of Fillmore Avenue in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 0.4 total acres of impervious area.
Ohio Street	This project consisted of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way on Ohio Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 6.1 total acres of impervious area.
Kenmore Avenue	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way on Kenmore Avenue in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 5.17 total acres of impervious area.
Genesee Gateway Project	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way on Genesee Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 2.8 total acres of impervious area.
Allen Street	This project will consist of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the portion of Allen Street between Main Street and Elmwood Avenue in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 2.5 total acres of impervious area.
Willert Park	This project will consist of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the portion of William Street between Michigan and Jefferson in the City of Buffalo.	This project is designed to control stormwater flow from 13.9 total acres of impervious area.
Northland Ave	This project will consist of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the portion of Northland Avenue between Fillmore and Grider in the City of Buffalo.	This project is designed to control stormwater flow from 6.1 total acres of impervious area.

Project Name	Project Description	Project Purpose*
Niagara Street Phase 1: Elmwood Street to Virgina Street	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the length of Niagara Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 2 total acres of impervious area.

Project Name	Project Description	Project Purpose*
Niagara Street Phase 2: Virgina Street to Porter Avenue	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the length of Niagara Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 7.3 total acres of impervious area.
Niagara Street Phase 3: Hampshire Street to Scajaquada Expressway	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the length of Niagara Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 15 total acres of impervious area in MS4 drainage areas and 25.5 in CSO drainage areas.
Niagara Street Phase 4a: Scajaquada Expy to Hertel Ave		
Niagara Street Phase 4b: Hertel Ave to Ontario St		
Niagara Street Phase 5: Porter Avenue to Hampshire Street		
Green 3 – 375 acres of GI Control	These projects will consist of multiple green infrastructure projects that will overlap in engineering and construction. Details will be provided in the Phase 2 Green Infrastructure Master Plan.	In general, these projects would be designed to retain stormwater flow from 375 acres of impervious area in the various sewer sheds in the targeted areas.
Green 4 – 263 acres of GI Control	These projects will consist of multiple green infrastructure projects that will overlap in engineering and construction. Details will be provided in the Phase 2 Green Infrastructure Master Plan.	In general, these projects would be designed to retain stormwater flow from 263 acres of impervious area in the various sewer sheds in the targeted areas.

Project Name	Project Description	Project Purpose*
Gray Projects		
CSOs 014/15 – Erie Basin In-line storage and optimization projects	**SEE DETAILS FOLLOWING FOR SPECIFIC PROJECTS**	
SPPs 206A&B	A new 113,000 gallon in-line storage facility was constructed in association with SPPs 206A&B to reduce CSOs at CSO 014. This site is located at Trenton Road/ Village Court north east of Fourth Street.	This project was designed to provide in-line storage thereby decreasing CSO 014 discharges through SPPs 206A&B. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Erie Basin through CSO 014 to 2 activations.
SPP 035	A new 50,000 gallon in-line storage facility was constructed between the Genesee Trunk and Swan Trunk sewers to create additional storage capacity in association with SPP 035 (CSO 015). This project is located to the north west of the intersection of South Elmwood Avenue and West Genesee Street.	This project was designed to provide in-line storage thereby decreasing CSO 015 discharges through SPP 35. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Erie Basin through CSO 015 to 0 activations.
SPP 036	This project consisted of the reconstruction of 35' of 30" sewer associated with SPP 036 to reverse the slope. This site is located on Church Street between the off and on ramps of the Skyway bridge (State Route 5).	This sewer reconstruction project was designed to increase the underflow capacity of the CSS thereby decreasing CSO 015 discharges. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Erie Basin through CSO 015 to 0 activations.
CSO 013 – Satellite storage, conveyance, FM & PS	CSO 013 is located at the extension of Virginia Street, in LaSalle Park, into the Black Rock Canal, the structure is tentatively planned to be built between the last SPP structure and the Canal. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	This storage project would provide off-line storage thereby decreasing CSO 013 discharges. Preliminary design is for a 0.3 MG offline storage facility. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Black Rock Canal through CSO 013 to 4 activations.

Project Name	Project Description	Project Purpose*
North Relief – Interceptor	The original conception of this project was of a deep tunnel relief sewer to run in the vicinity of Niagara Street between Bird Avenue and Albany Street with an additional line connecting the tunnel to the WWTP influent siphon. Preliminary design is for 5,310' of 96"pipe and 571' of 120" pipe. Due to site constraints this project may be redesigned.	The purpose of this project is to reduce discharges through CSOs 004, 011, and 012, by creating a new relief sewer thereby creating offline storage capacity capacity in the CSS. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Black Rock Canal through CSO 004 to 3 activations, CSO 011 to 4 activation, and CSO 012 to 2 activations.

Project Name	Project Description	Project Purpose*
CSOs 010, 008/010, 061, 004 – Underflow capacity upsizing	This project will consist of upsizing of underflow piping to maximize flow to the interceptors. This project is tentatively proposed for between Breckenridge Street and Brace Street along the I-190 with an extension along Brace Street across Niagara Street.	This underflow capacity upsizing project would increase the capacity of the CSS thereby decreasing CSO 010, 008, 061 and 004 discharges. Together with other LTCP projects, this project is projected based on the 1993 Modified Typical Year to reduce discharges to the Black Rock Canal through CSO 004 to 3 activations, CSO 010 to 1 activations, CSO 008 to 0 activations, and CSO 061 to 4 activations.
SPP 337 (CSO 053) – Satellite storage, conveyance, FM & PS	SPP 337 is located at Colorado Street North of Scajaquada Street. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 53 to the Scajaquada Creek. Preliminary design is for a 0.7 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 336A&B (CSO 053) – Satellite storage, conveyance, FM & PS	SPP 336A&B are located on Humboldt Parkway on each side of the Scajaquada Drain. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 53 to the Scajaquada Creek. Preliminary design is for a 4.2 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to Scajaquada Creek based on the TY to 4 activations.
Jefferson Avenue & Florida Street (CSO 053) – Satellite storage, conveyance and FM	The proposed location for this facility is in the vicinity of the intersection of Jefferson Avenue and Florida Street. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 53 to the Scajaquada Creek. Preliminary design is for a 2.6 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to Scajaquada Creek based on the TY to 4 activations.
CSO 055 – Satellite storage, conveyance, FM & PS	For CSO 055, the proposed storage facility would be located upstream of the regulator, near Military Road. At this location, an offline facility would be constructed and flows above 26 MGD (instantaneous peak) would be diverted from the South Hertel Trunk sewer into the storage facility. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 55 to the Niagara River. Preliminary design is for a 7.5 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to the Niagara River through CSO 55 based on the TY to 9 activations.

Project Name	Project Description	Project Purpose*
CSOs 028/044/047 - Satellite storage, conveyance, FM & PS	The proposed location for this facility is underneath the Tops parking lot between South Park Avenue and the Buffalo River. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 28 to the Buffalo River and through CSOs 047 and 044 to Cazenovia Creek. Preliminary design is for a 2.3 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges based on the TY to 6 activations through CSO 028, 2 activations through CSO 044 and 3 activations through CSO 047.
CSO 052 – Satellite storage, conveyance, FM & PS	The proposed location for this facility is in the vicinity of South Ogden Street between Mineral Springs Road and Cazenovia Creek. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 52 to the Buffalo River. Preliminary design is for a 0.6 MG offline storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to the Buffalo River through CSO 052 based on the TY to 3 activations.
CSO 064 – Satellite storage, conveyance, FM & PS	The proposed location for this facility is in the vicinity of the confluence of Ohio, Louisiana and Saint Claire Streets. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 064 to the Buffalo River. Preliminary design is for a 0.1 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to the Buffalo River through CSO 064 based on the TY to 3 activations.

***Note:** Black Rock Canal Performance Criterion is 4 Activations in the Typical Year
Buffalo River Performance Criterion is 6 Activations in the Typical Year
Cazenovia Creek - B Performance Criterion is 4 Activations in the Typical Year
Cazenovia Creek - C Performance Criterion is 6 Activations in the Typical Year
Erie Basin Performance Criterion is 2 Activations in the Typical Year
Niagara River Performance Criterion is 9 Activations in the Typical Year
Scajaquada Creek - Performance Criterion is 4 Activations in the Typical Year

Attachment C to the Semi-Annual Status Report: September 2019

Public Meeting Materials

BUFFALO
SEWER AUTHORITY

Wet Weather Operational Optimization Program Update

Greater Buffalo Environmental Conference

March 19, 2019

Catherine Knab, P.E., Buffalo Sewer Authority

Kristina Macro, EIT, EmNet

Agenda

- BSA collection system and RTC Program overview
- Site evaluation process
- Performance of installed sites
- Benefits of coordinated control

BSA Collection System

- 790 out of 850 miles of sewer are combined
- **North District**
  - 6 CSOs
  - Main Receiving Water – Niagara River
- **Scajaquada District**
  - 11 CSOs
  - Main Receiving Waters – Black Rock Canal and Scajaquada Creek
- **South Central District**
  - 35 CSOs
  - Main Receiving Waters – Cazenovia Creek and Buffalo River

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BSA Wet Weather Operational Optimization Objectives

- To enable BSA to control every ounce of collection system storage
- Identify new RTC opportunities
- Continuous system improvement

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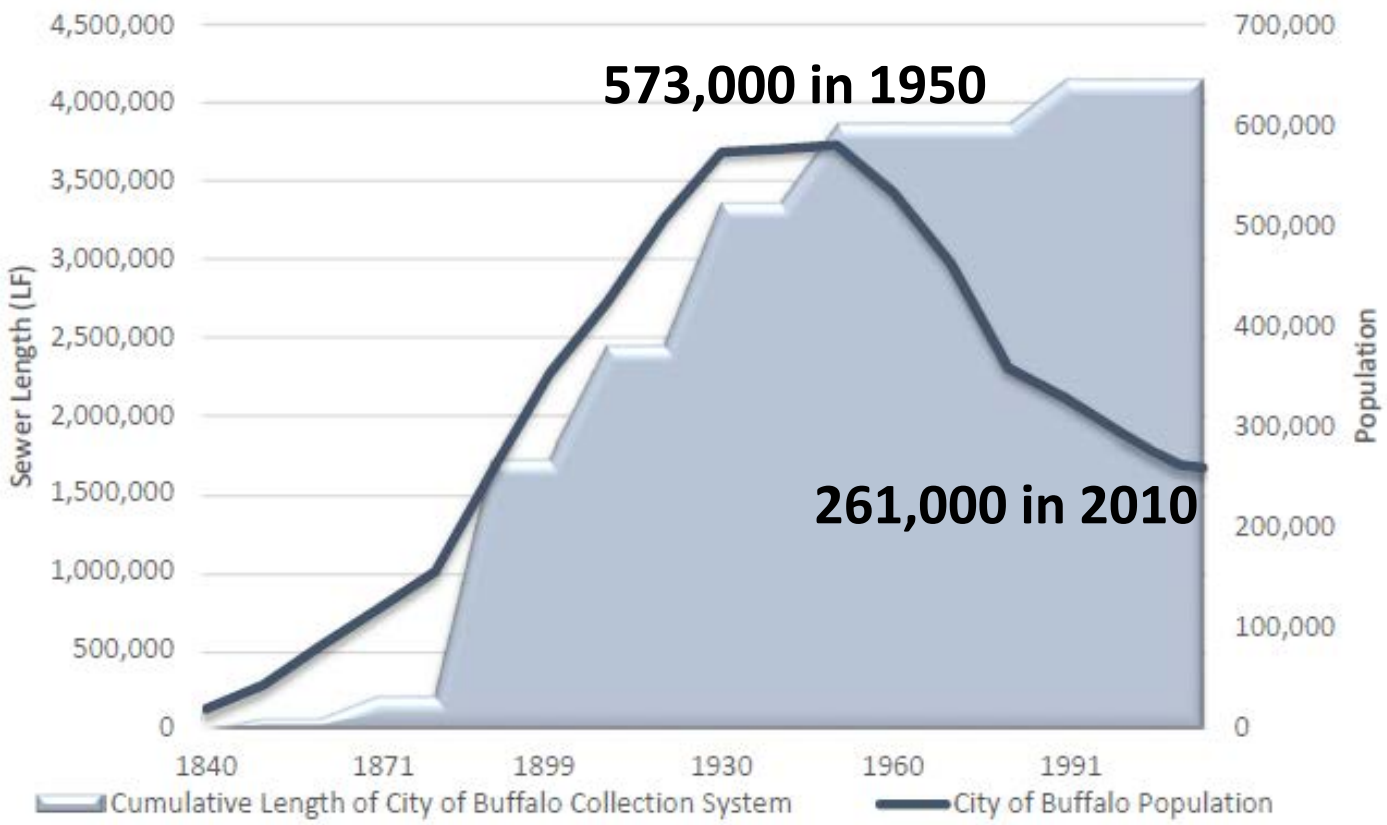
Changing Service Requirements

55% Population decrease
Industry decrease



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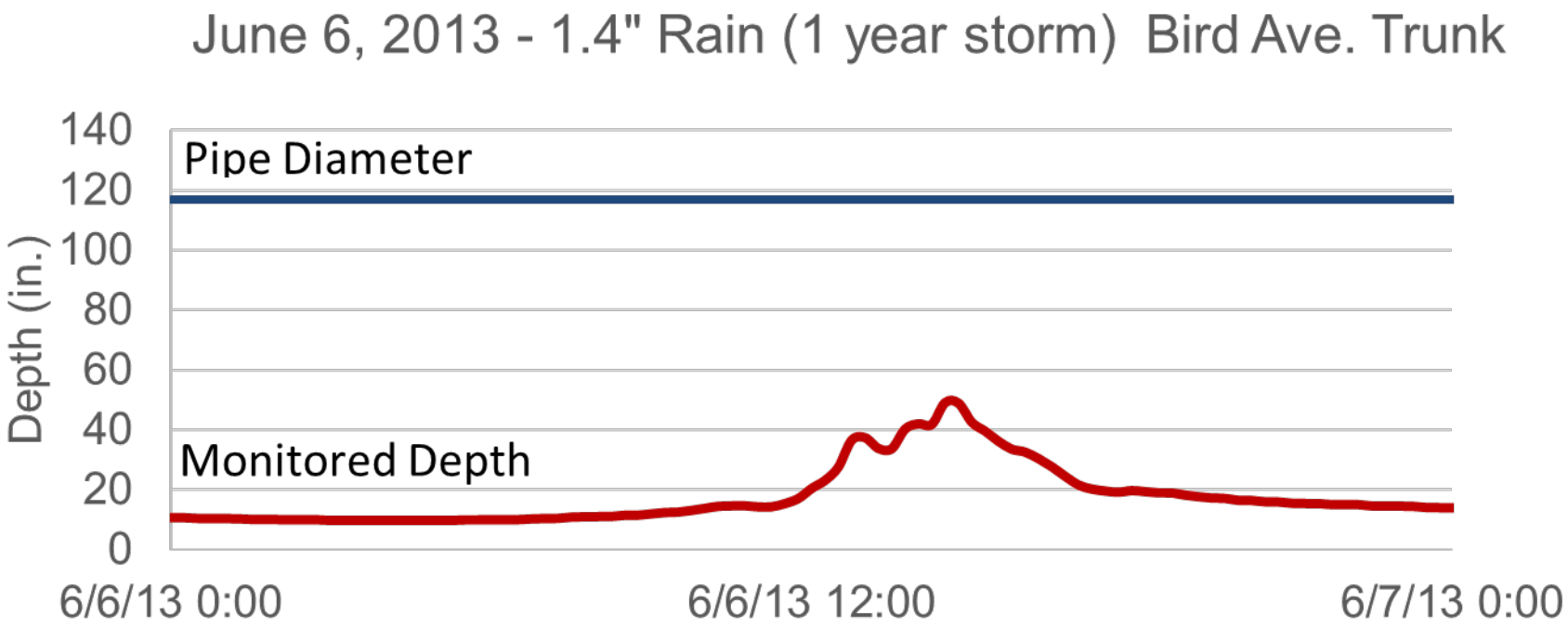
Unused Capacity in System

- 8 major trunklines were more than half empty during the peaks of the largest expected storm events



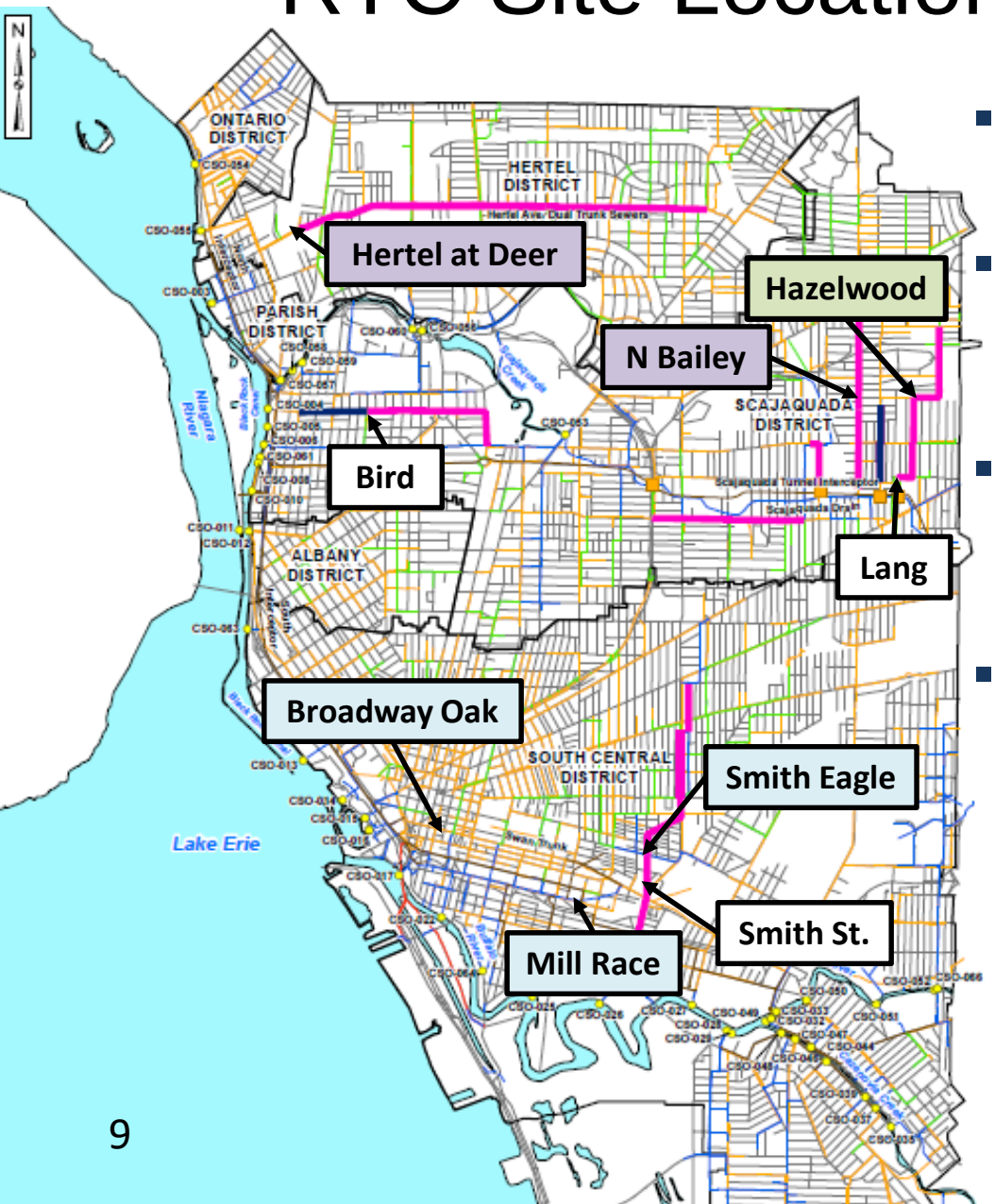
Opportunity: Real Time Control

- Underutilized trunklines provide a cost-effective opportunity for inline storage to reduce overflows
- Real Time Control (RTC) systems maximize the benefits of inline storage for any given storm

RTC: Cost-Effective Solution for LTCP

- LTCP Approved in 2014 - up to 16 in-line storage sites
- RTC Evaluations (2011, 2017, 2018)
- Site specific approach to bring area to compliance
  - **In-line Storage (ILS):** Larger diameter pipes with excess capacity available during storm events to store wastewater
  - **RTC Interception**: Increasing flows to interceptors downstream of ILS sites that are under-utilized during storm events

RTC Site Locations and Status



- **In Service:**
  - Smith St, Lang, and Bird
- **Completed, undergoing tuning:**
  - Hazelwood – coordinates with Lang's operations
- **In Construction:**
  - North Bailey and Hertel at Deer
- **In Design:**
  - Broadway Oak, Mill Race, and Smith Eagle

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Site Selection Criteria

- Pipe dimensions
  - Diameter over 5 ft and length over 1,000 ft
- Utilization during wet weather events
- Location of side sewer connections
- Trunk lines and outfall lines with the ability to drain back to the interceptor by gravity

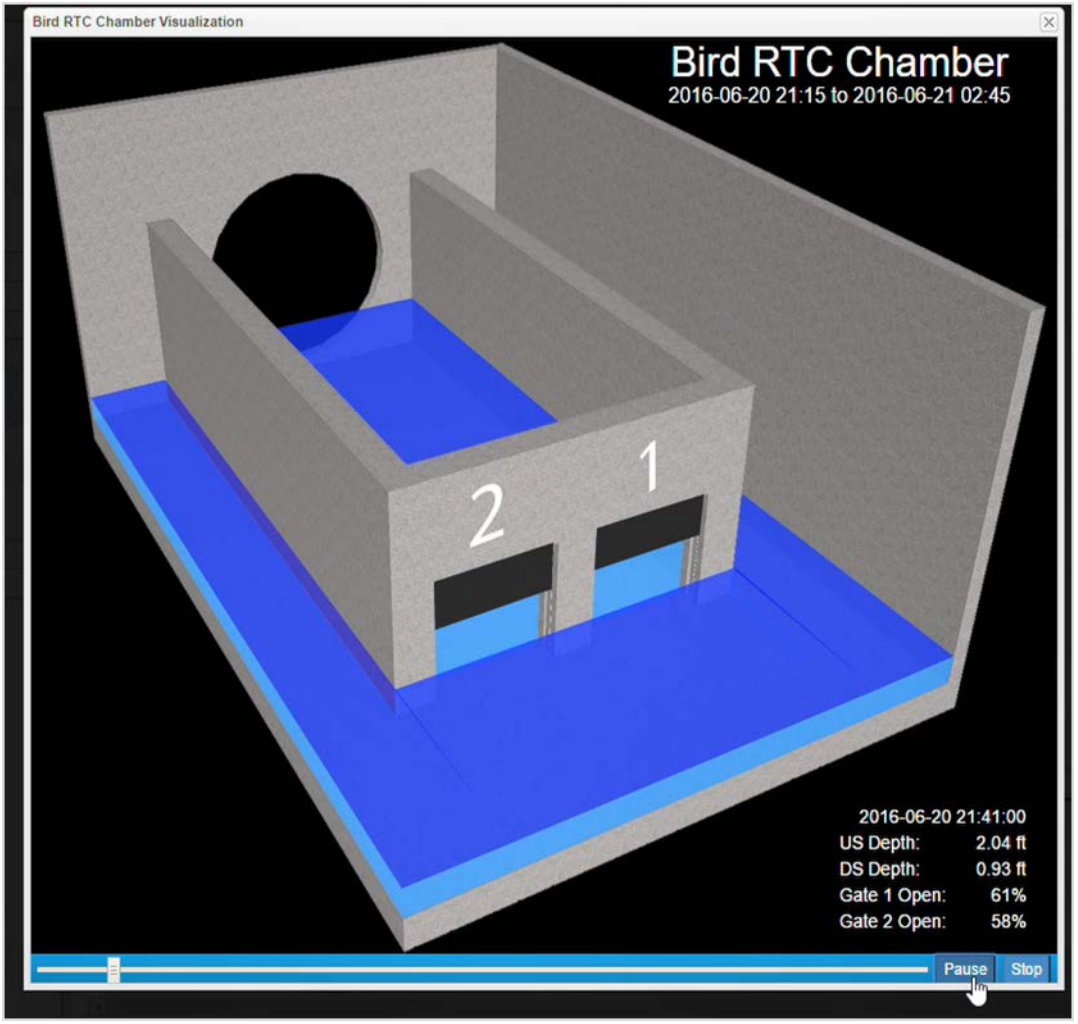
Site Prioritization Criteria

1. Reduction of the number of Sewer Patrol Point (SPP) activations
2. Reduction of the cumulative amount of SPP overflow volume
3. Reduction of system-wide overflow volume
4. Reduction of overflow volume into higher priority water bodies

RTC ILS Design

- Constraints:
  - Cannot increase overflows upstream of RTC
  - Keep HGL with 8’ freeboard or fully contained in pipe (to prevent basement backup)
  - Shallow enough to control construction costs
- Goal:
  - Utilize storage in wet weather to free up capacity in other areas of the system

ILS Chamber Design



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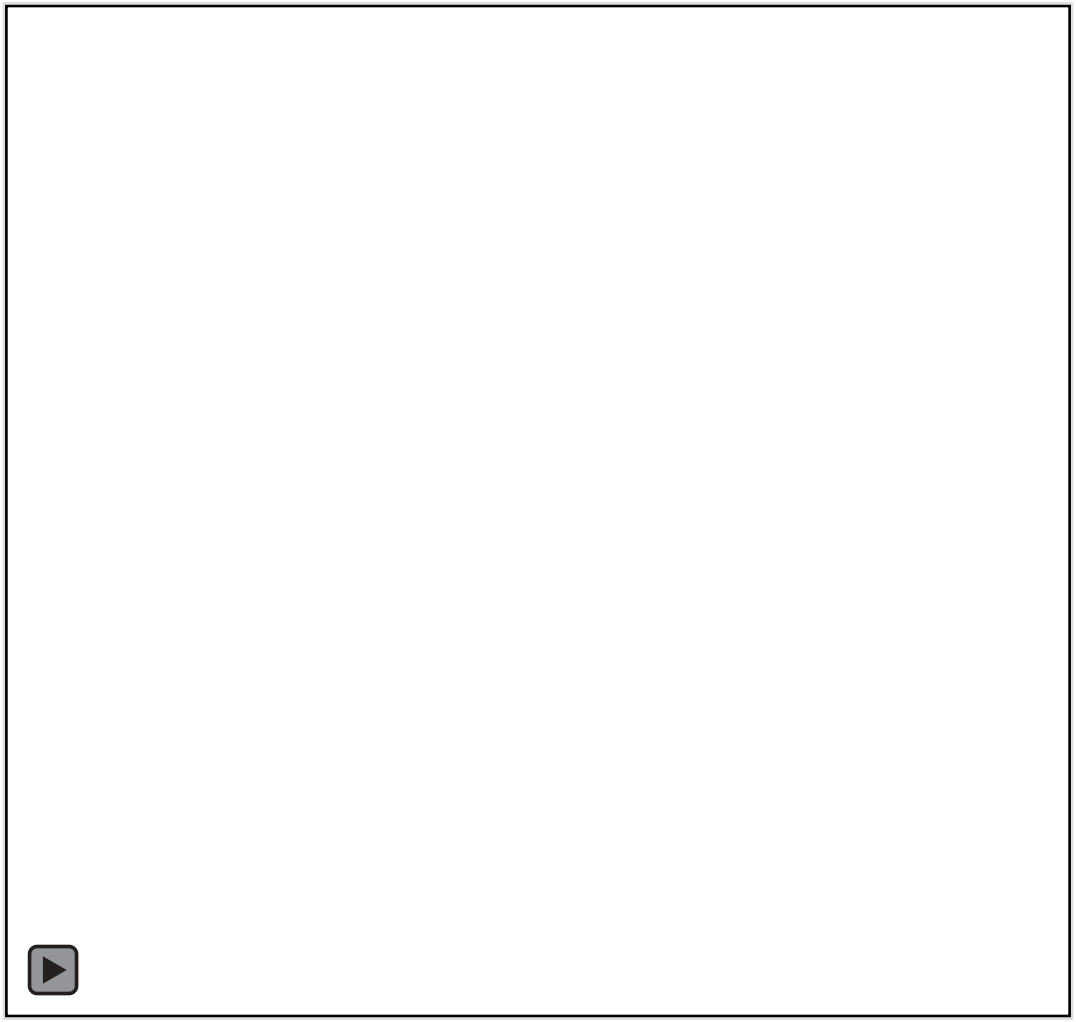
ILS Chamber Design



2018 RTC Re-Evaluation

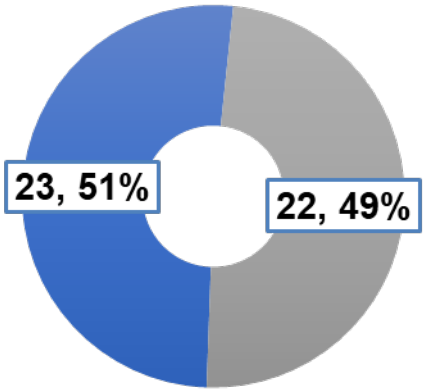
- Identify and prioritize additional sites to reduce overflow volumes
- Followed same criteria as 2017 evaluation
- Newly calibrated model used for analysis
  - Included active RTC sites to determine additional benefit
  - Re-evaluated previously identified RTC sites

Key Performance Indicators (KPIs)

- Monthly reports for each RTC site
  - Used to identify opportunities for continuous improvement
- Bird and Lang
  - Number and volume of SPP activations prevented vs. occurred
  - Unused storage during SPP activation?
- Smith St.
  - Total volume captured = volume stored + volume sent to South Interceptor

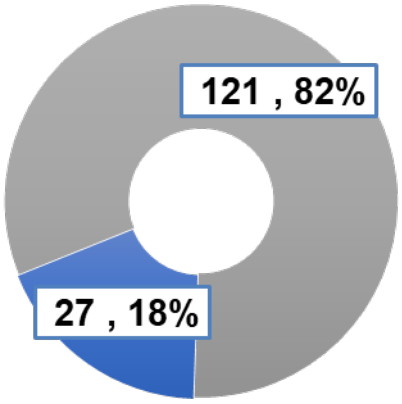
Bird Performance
July 2018 – Jan. 2019

Prevented SPP Events



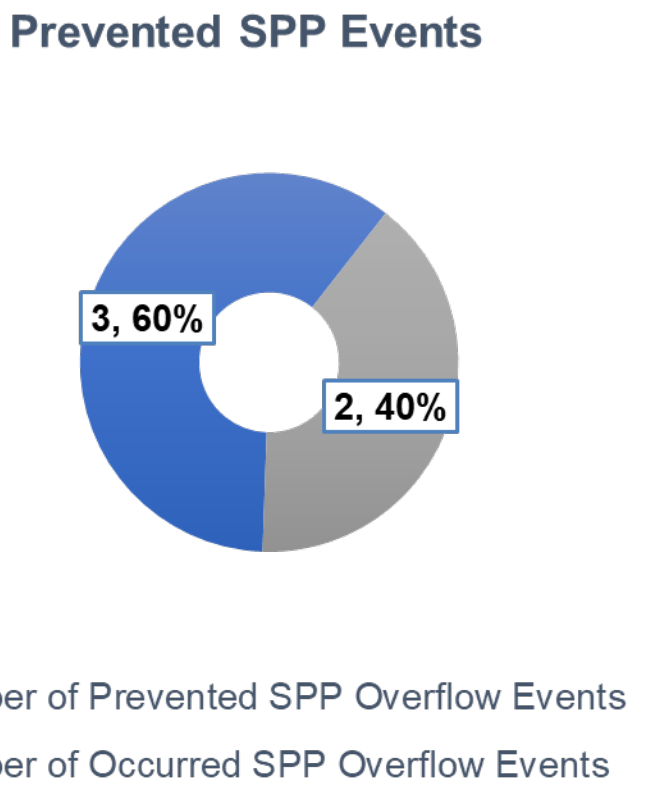
- Number of Prevented SPP Overflow Events
- Number of Occurred SPP Overflow Events

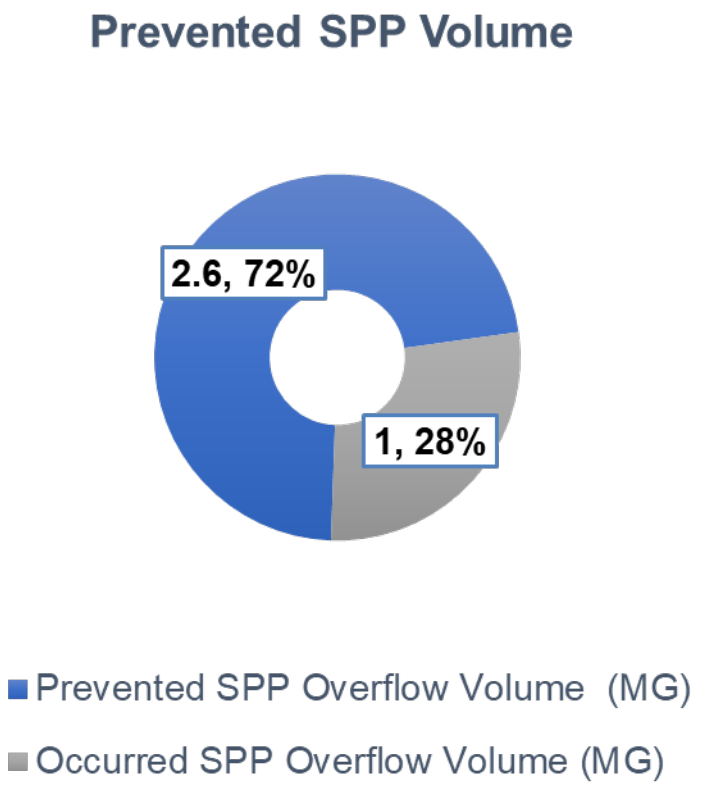
Prevented SPP Volume



- Prevented SPP Overflow Volume (MG)
- Occurred SPP Overflow Volume (MG)

Lang Performance
July 2018 – Aug. 2018





Note: Lang was in manual open mode September 2018 – early January 2019 to protect Hazelwood construction site upstream

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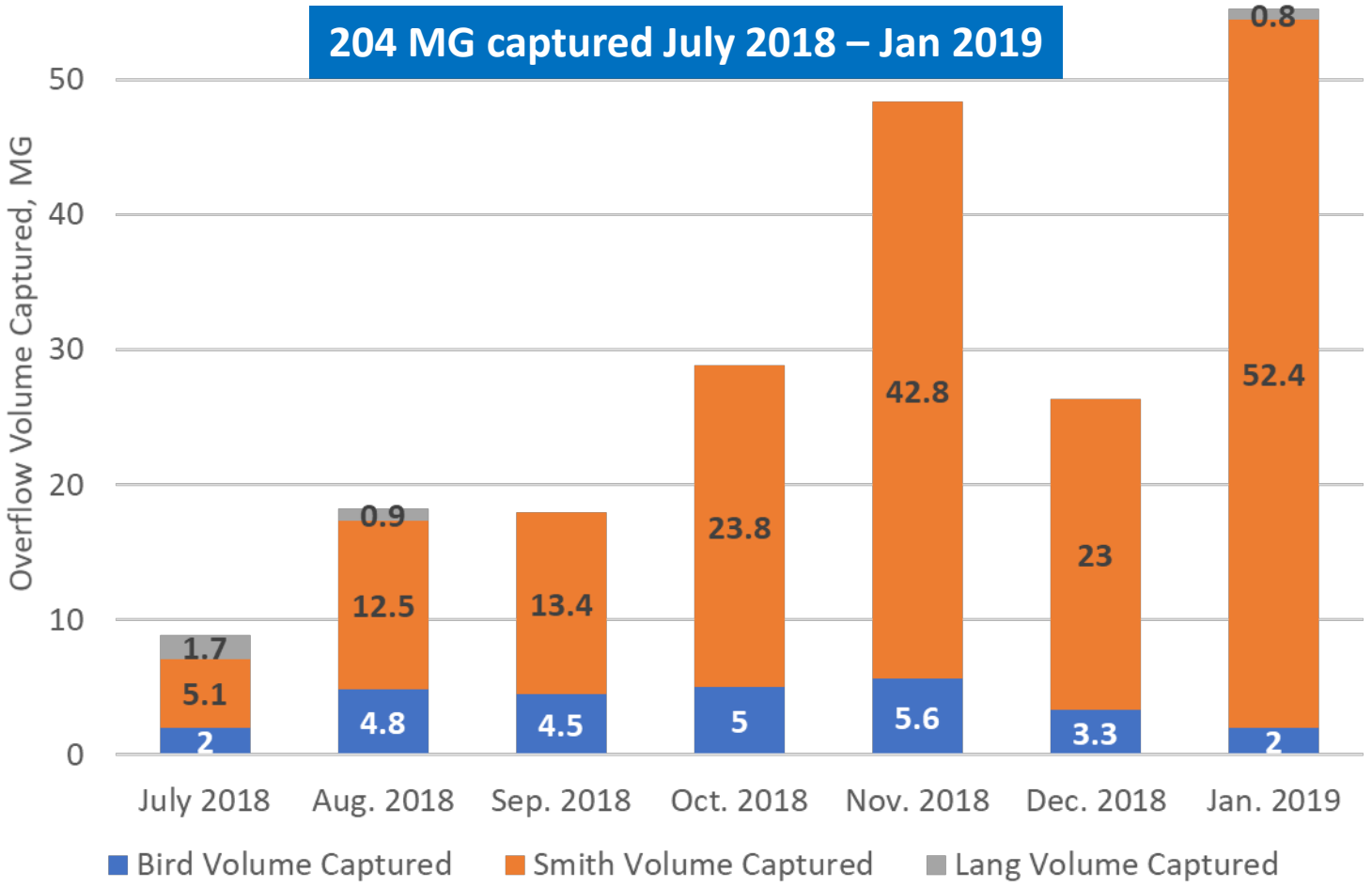
Installed Site Performance

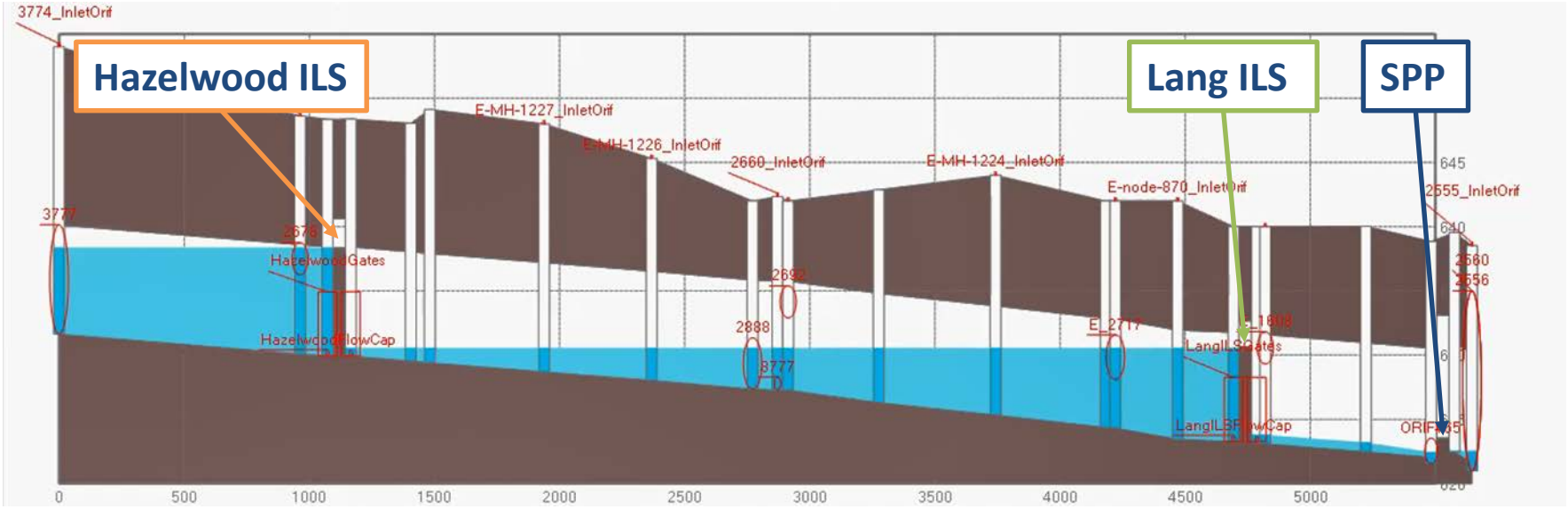


Note: Lang was in manual open mode September 2018 – early January 2019 to protect Hazelwood construction site upstream

Coordinated Control of RTC Sites

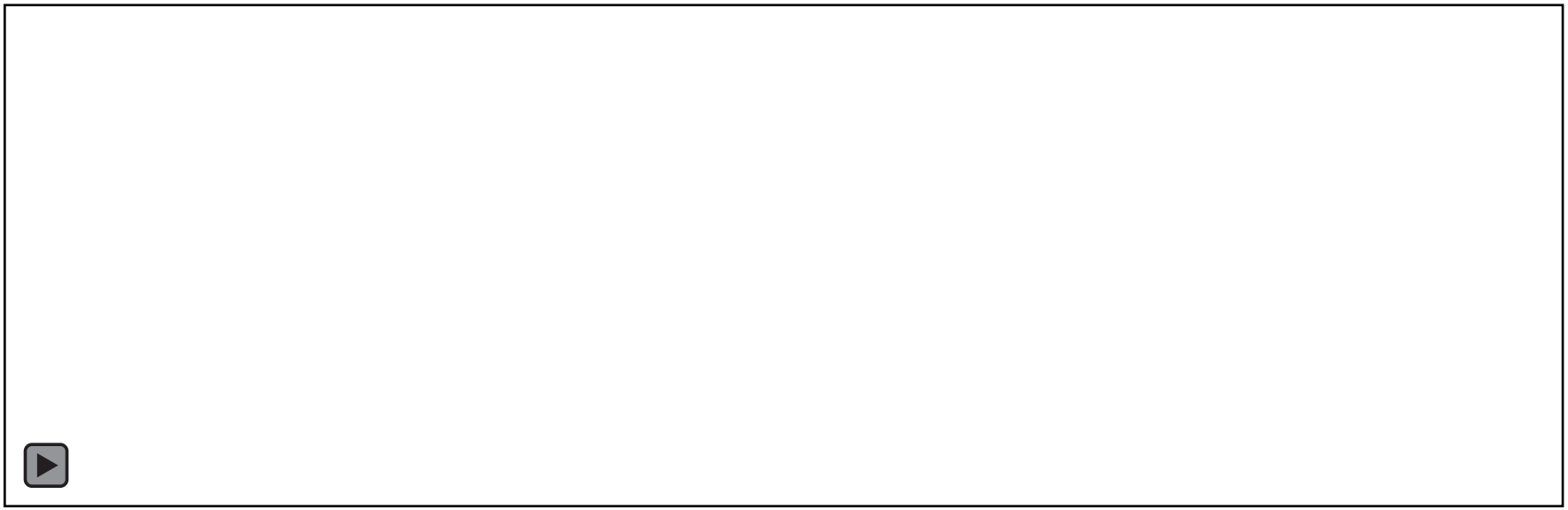
- Sites communicate with each other to signal when wet weather is happening and find where capacity exists in the system
- Benefits
  - Utilize individual ILS sites more efficiently
  - Higher systemwide overflow volume capture

Hazelwood and Lang Coordinated Control



v1.4-coord

Hazelwood and Lang Coordinated Control



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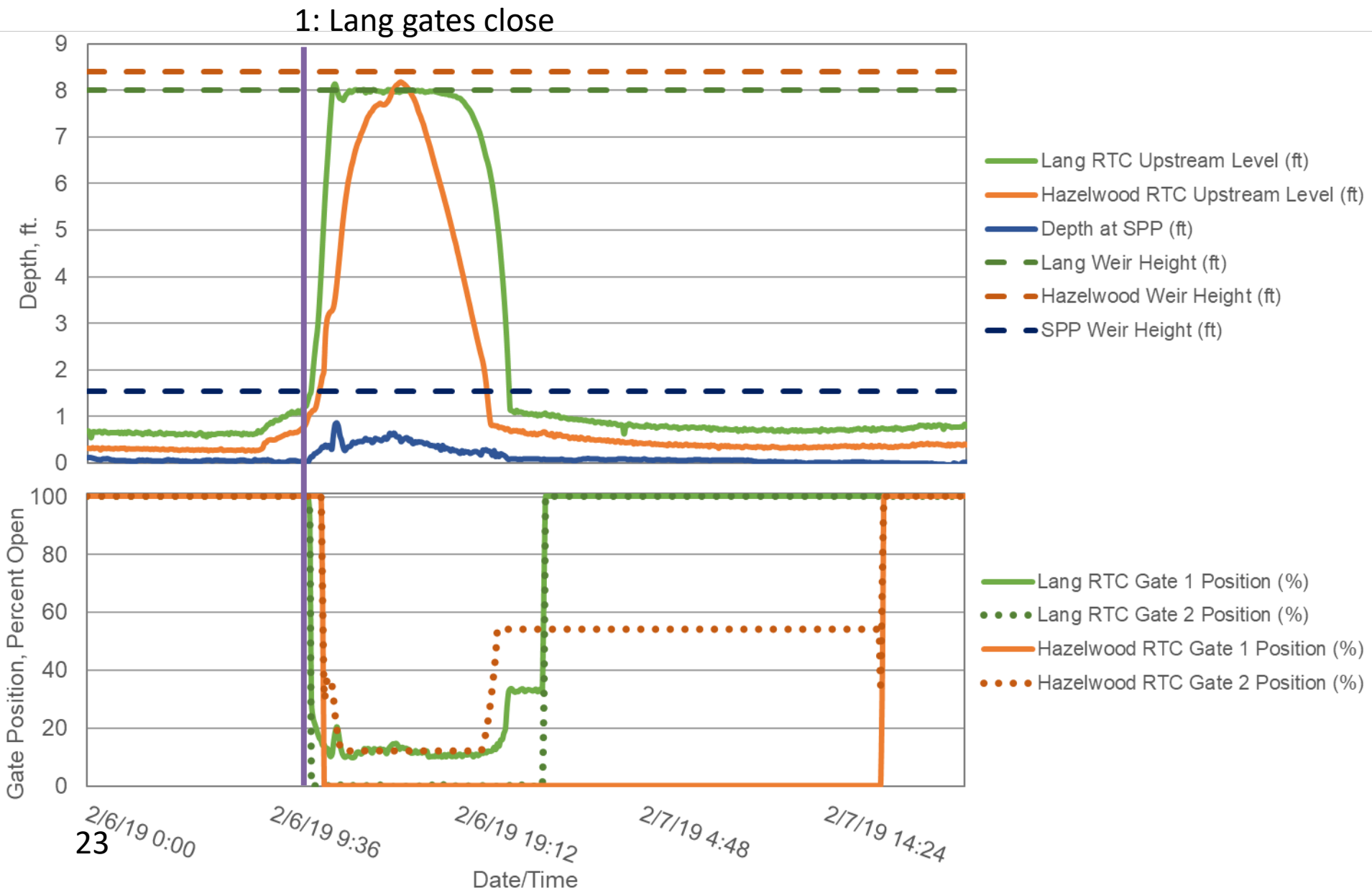
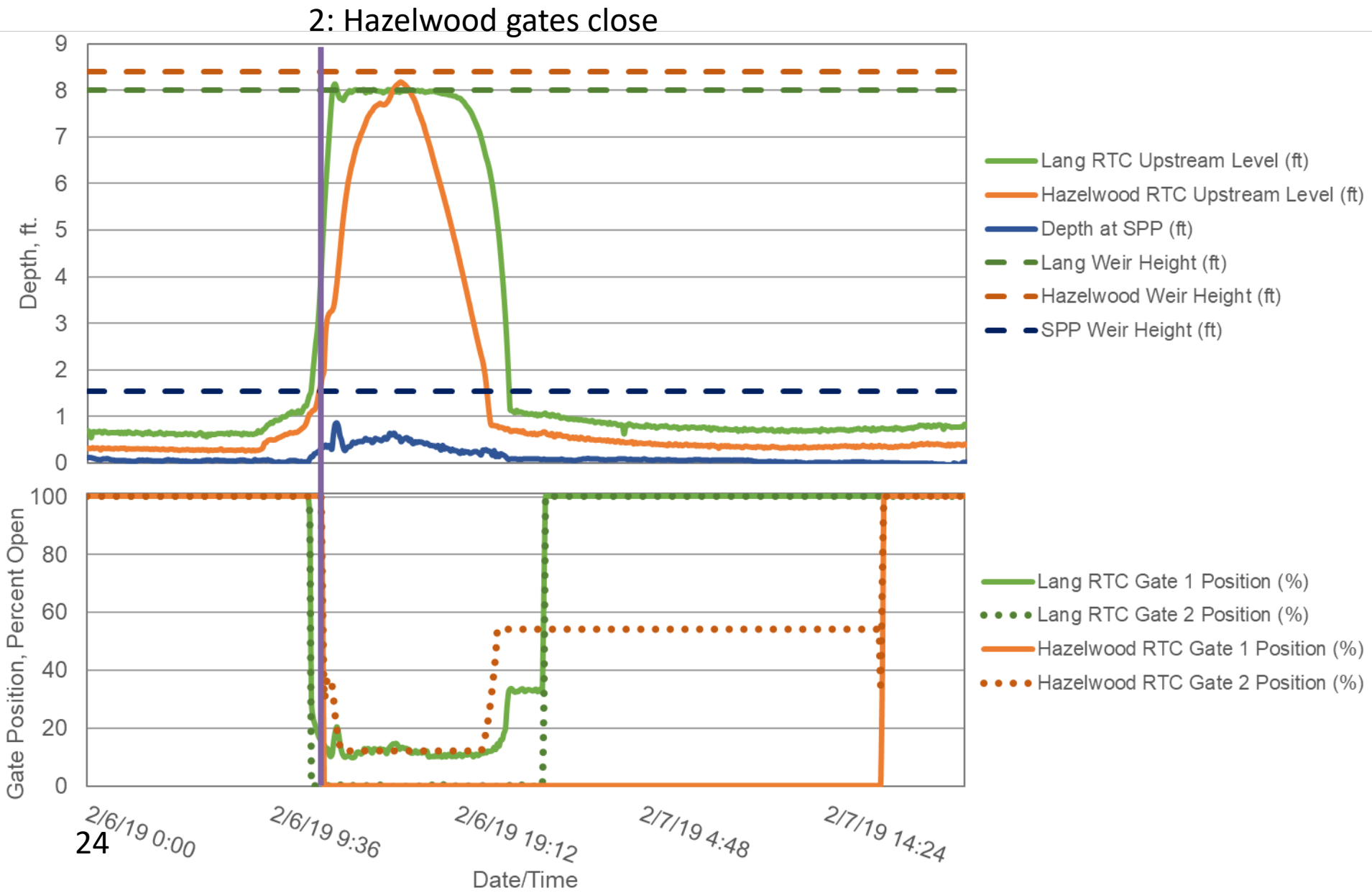
Hazelwood and Lang Coordinated Control

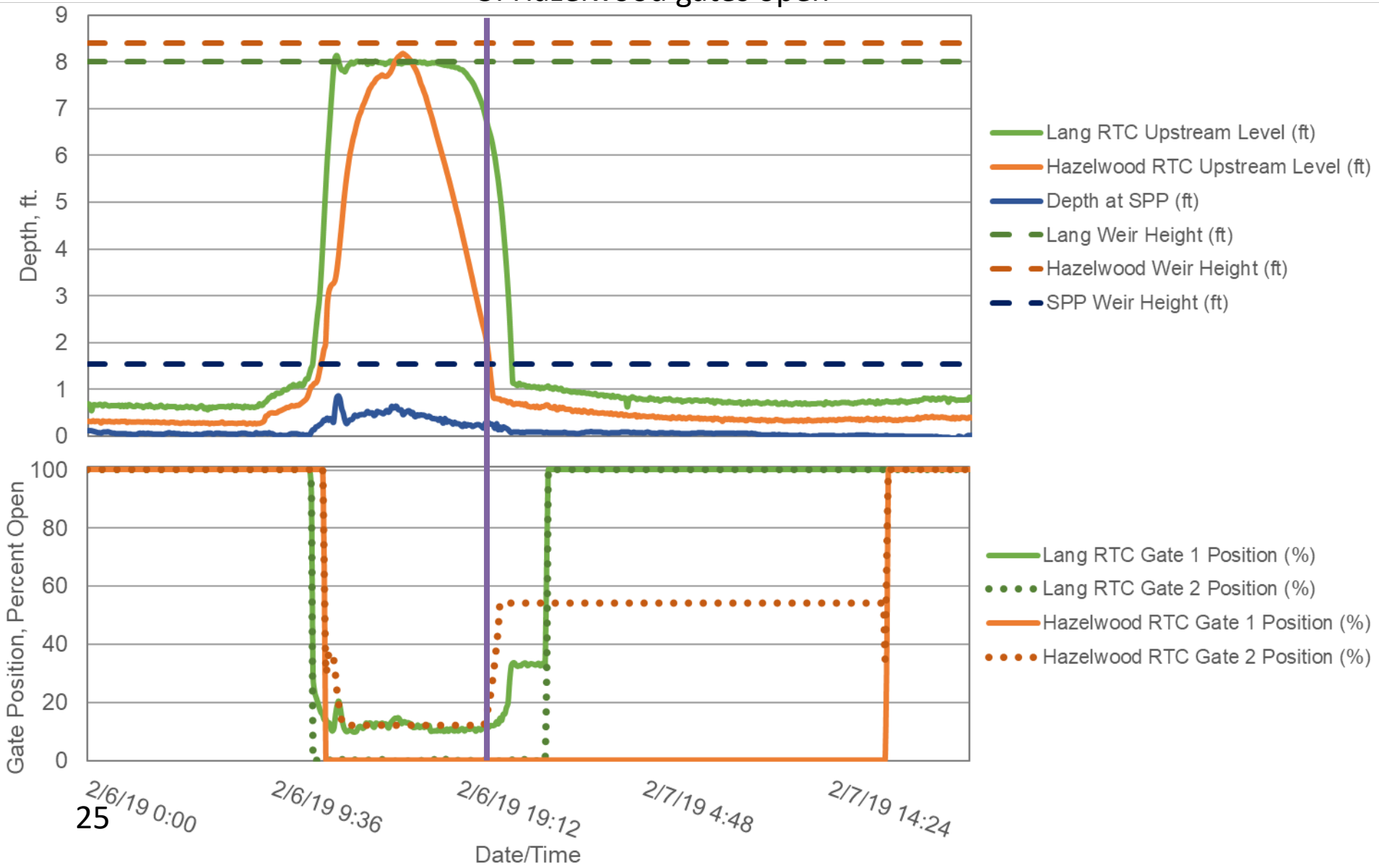


Hazelwood and Lang Coordinated Control



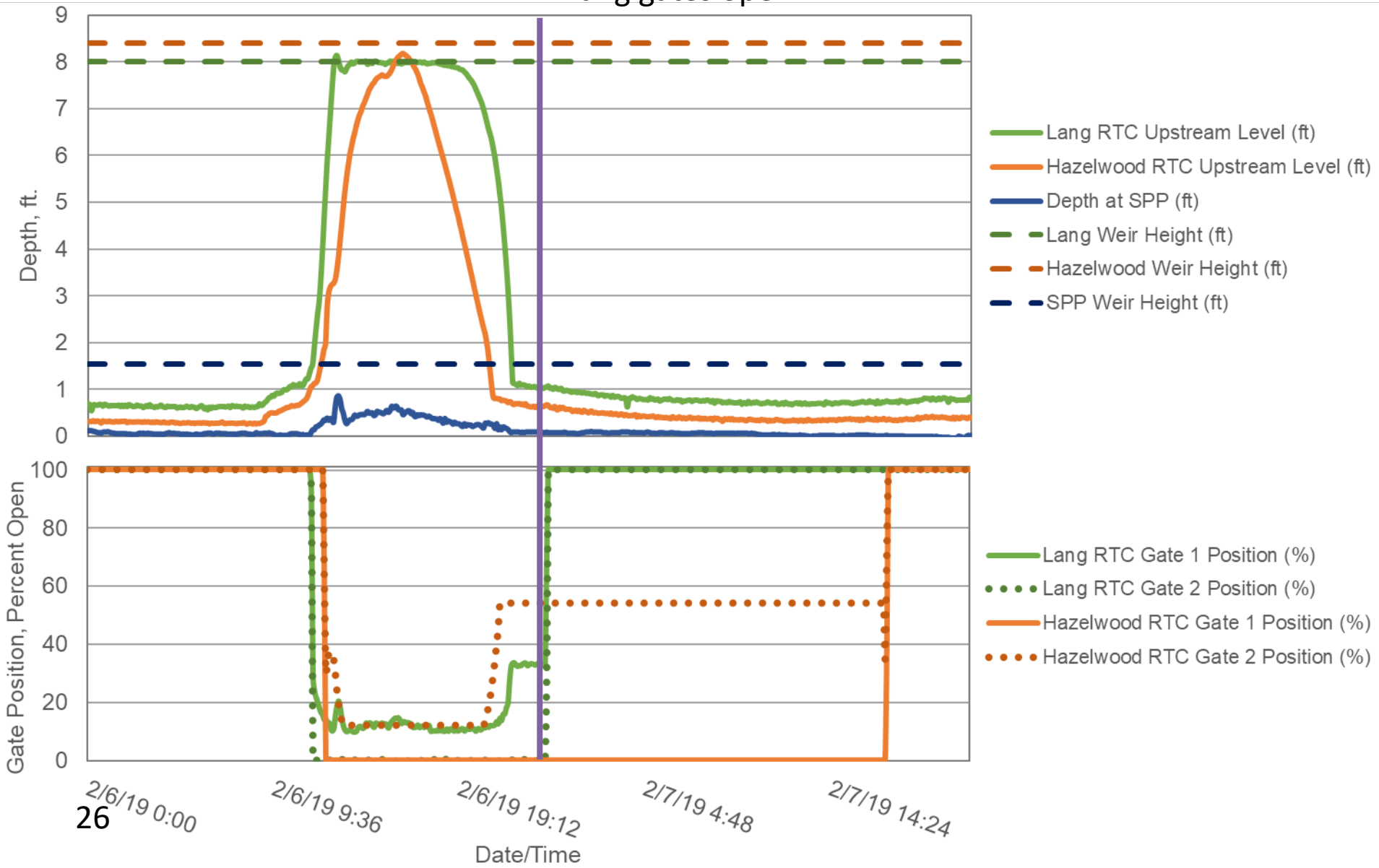
Hazelwood and Lang Coordinated Control

3: Hazelwood gates open



Hazelwood and Lang Coordinated Control

4: Lang gates open



Hazelwood and Lang KPIs

February 6, 2019		1

RTC Site	Lang	Hazelwood
Mode	Auto-Local	Auto-Remote
Gate Activation Trigger Depth:	1.45 ft.	1.85 ft.
Return to Normal Depth:	1.07 ft.	0.36 ft.
Time Gate 1 Activated:	2/6/2019 11:30	2/6/2019 12:10
Time Gate 2 Activated:	2/6/2019 11:30	2/6/2019 12:10
Time Gate 1 Returned to Normal:	2/6/2019 23:50	2/7/2019 17:25
Time Gate 2 Returned to Normal:	2/6/2019 23:50	2/7/2019 17:25
Depth of Weir	8 ft.	8.4 ft.
Maximum Depth Reached:	8.00 ft.	8.19 ft.
Volume Stored:	844,449 Gal.	1,094,076 Gal.
Unused Storage Volume:	0 Gal.	54,119 Gal.

Percent Capture	100%
Overflow Volume:	0 Gal.
Overflow Volume Prevented:	1,938,525 Gal.
SPP Activation Prevented:	Yes
If No, what is the overflow volume when storage was available?	NA
If No, could SPP activation have been prevented?	NA
If Yes, could SPP activation have been prevented without Hazelwood storage?	No

SPP:	340
Analysis Date:	2/22/2019
Event Start Date/Time:	2/6/2019 11:30
Event End Date/Time:	2/6/2019 23:50

Analyst Name, Organization:	Kristina Macro, EmNet
Total Rainfall Accumulation:	0.16 in.
Storm Event Duration:	2 hr.
Storm Type:	Less than 1 yr. storm

Recommended Operational Changes/Notes:

DRAFT

Conclusions

- RTC has helped prevent more than 200 MG of overflows in the past 6 months
- Coordinated control of RTC sites is an exciting opportunity that will increase ILS efficiency and reduce CSO events

Next Steps

- Tune controls at Hazelwood site
- Complete construction for North Bailey and Hertel at Deer sites
- Begin design for next round of sites
- Identify additional opportunities for coordinated control in the next RTC site evaluation

Long Term Control Plan

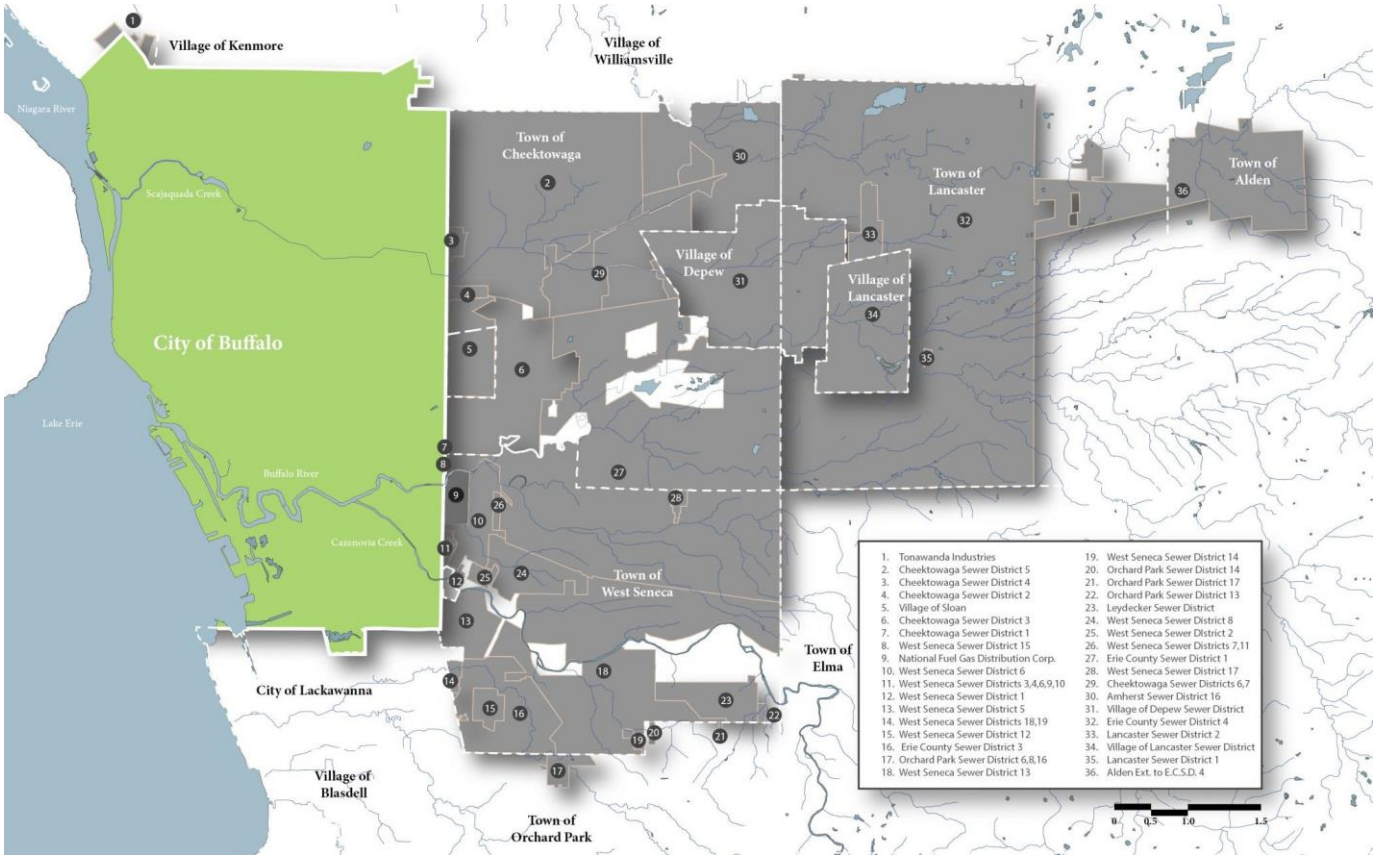
BUFFALO
SEWER AUTHORITY

Catherine Knab, P.E., PMP
Principal Sanitary Engineer

Kevin Meindl
Landscape Architect

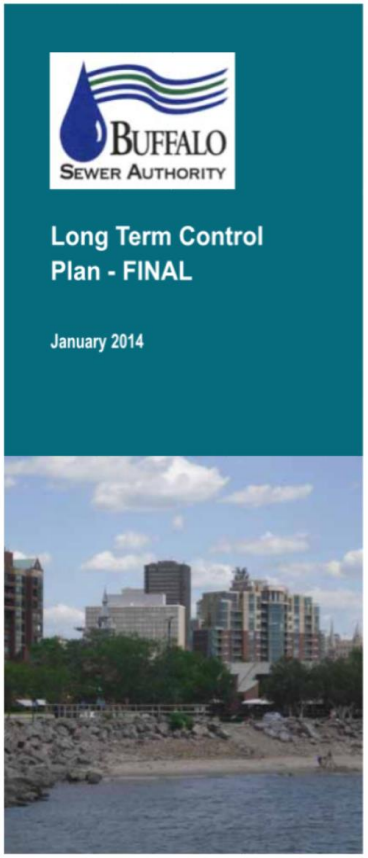
Buffalo Sewer Authority OVERVIEW

- Established in 1938
- Services the City of Buffalo, NY and 11 Surrounding Municipalities
- 110 Square Miles of Coverage, 850 miles of sewer pipe
- Serves Over 550,000 People
- Annual Operating Budget of $54.9 Million
- Undertakes Over $20 Million in Capital Projects Annually



Long Term Control Plan

- Long Term Control Plan (LTCP) Approved by Agencies in 2014
- 20 year plan to be completed by March, 2034
- BSA Committed to Invest $430 Million Over 20 Years on Projects
- 97% of Wet Weather Flows to be Captured upon Completion of LTCP
- Manage 1,315 acres of impervious surface area with Green Infrastructure



Buffalo Sewer is implementing a $380 million infrastructure plan aimed at tackling the stormwater challenge.

Gray

Expanding the capacity and efficiency of our pipes, pumps, and underground infrastructure.

Smart

Using “real time” sensors to move stormwater away from parts of the sewer system hit with lots of rain and snowmelt.

Green

Preventing or slowing water from reaching the sewer system with “green infrastructure.”

The First Generation of Public Green Infrastructure Investments.

Green Streets

Green Parking Lots

Demolitions and Vacant Lot Restoration

Rain Barrels and Downspout Disconnections

RAINCHECK

Green Streets

Keeping the stormwater challenge in check

De-Paving

Reducing the amount of paved surfaces on streets or sidewalk areas through techniques like “road diets” offer more green space to absorb water, keeping it out of the sewer system.

Porous Pavement

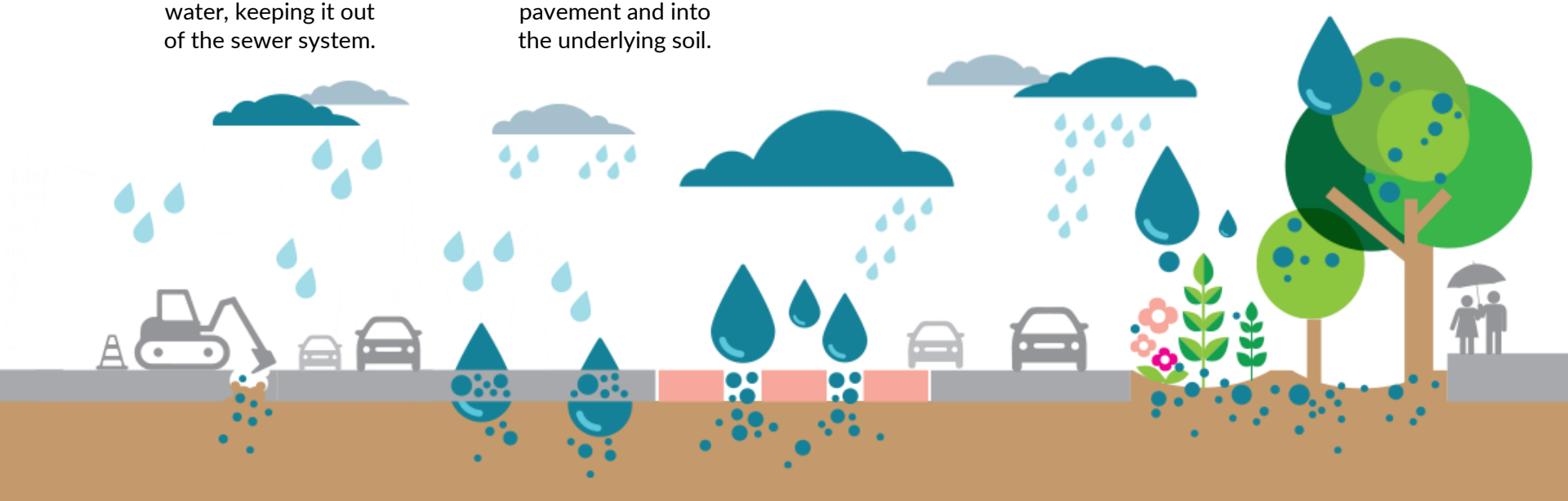
Porous pavement gives rain and snowmelt a place to go rather than the storm inlets on the sides of curbs. Water absorbs through the pavement and into the underlying soil.

Rain Gardens

These plant beds collect stormwater runoff from street and sidewalk pavement and absorb it into the soils below.

Street Trees

Trees capture and store rainfall in their leaves and roots and release it into the atmosphere.



More than 9 miles of green streets across Buffalo

are helping us meet our stormwater challenge

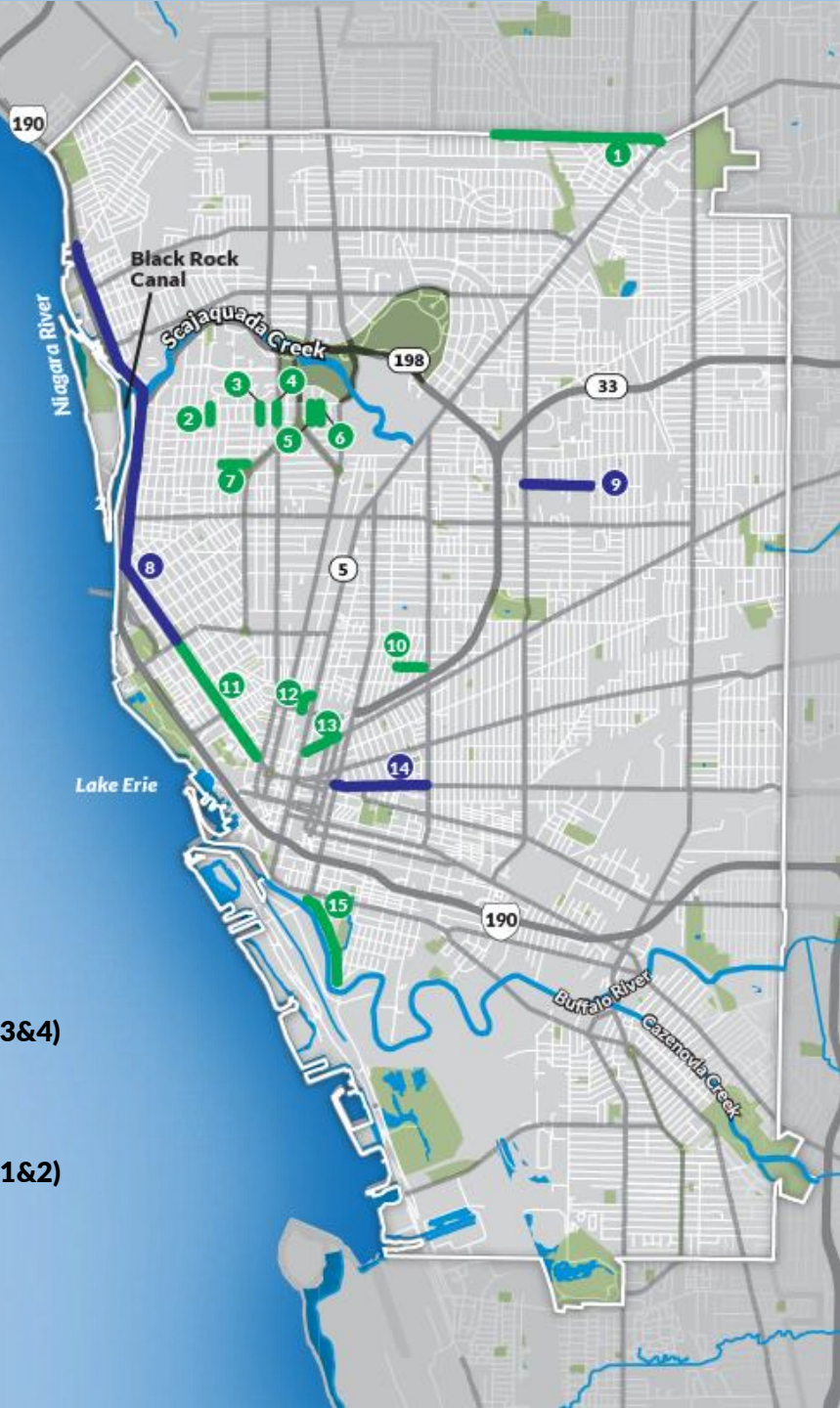
101.5 acres managed for stormwater

15.9 acres of impervious surfaces reduced

1,908,045

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

1. Kenmore Ave
2. Parkdale Ave
3. Claremont Ave
4. Elmwood Ave
5. Windsor Ave
6. Clarendon Ave
7. Ardmore Place
8. Niagara Street (Phase 3&4)
9. Northland Ave
10. Carlton St
11. Niagara Street (Phase 1&2)
12. Pearl St
13. Genesee St
14. William St
15. Ohio St



Ohio Street

70,824

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

3.2 acres of impervious surfaces removed

260 trees planted

William Street

284,357

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

1.3 acres of impervious surfaces removed

64 trees planted

0.66 acres of porous pavement added

Green Parking Lots

Keeping the stormwater challenge in check

Rain Gardens

These plant beds collect stormwater runoff from parking lots, streets and sidewalks, allowing water to absorb into the ground rather than running off the lot and eventually reaching our waterways.

Porous Pavement

Porous pavement uses special types of street surfacing material, like porous asphalt, that allows stormwater and snowmelt to pass through the surface and flow into the ground.

2.35 acres of green parking lots across Buffalo

are helping us meet our stormwater challenge

6.8 acres managed for stormwater

2.7 acres of impervious surfaces reduced

257,083

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

6 Green Parking Lot Projects

1. North Buffalo Ice Rink
2. Broderick Park
3. 1401 Fillmore Avenue
4. 1384 Fillmore Avenue
5. Pratt Willert Community Center
6. JFK Community Center

North Buffalo Ice Rink

112,208

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

0.7 acres of porous pavement added

JFK and Pratt Willert Community Centers

14,063

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

3 rain gardens planted

Demolitions and Vacant Lot Restoration

Keeping the stormwater challenge in check

Rain Gardens

These plant beds collect stormwater runoff from parking lots, streets and sidewalks, allowing water to absorb into the ground rather than running off the lot and eventually reaching our waterways.

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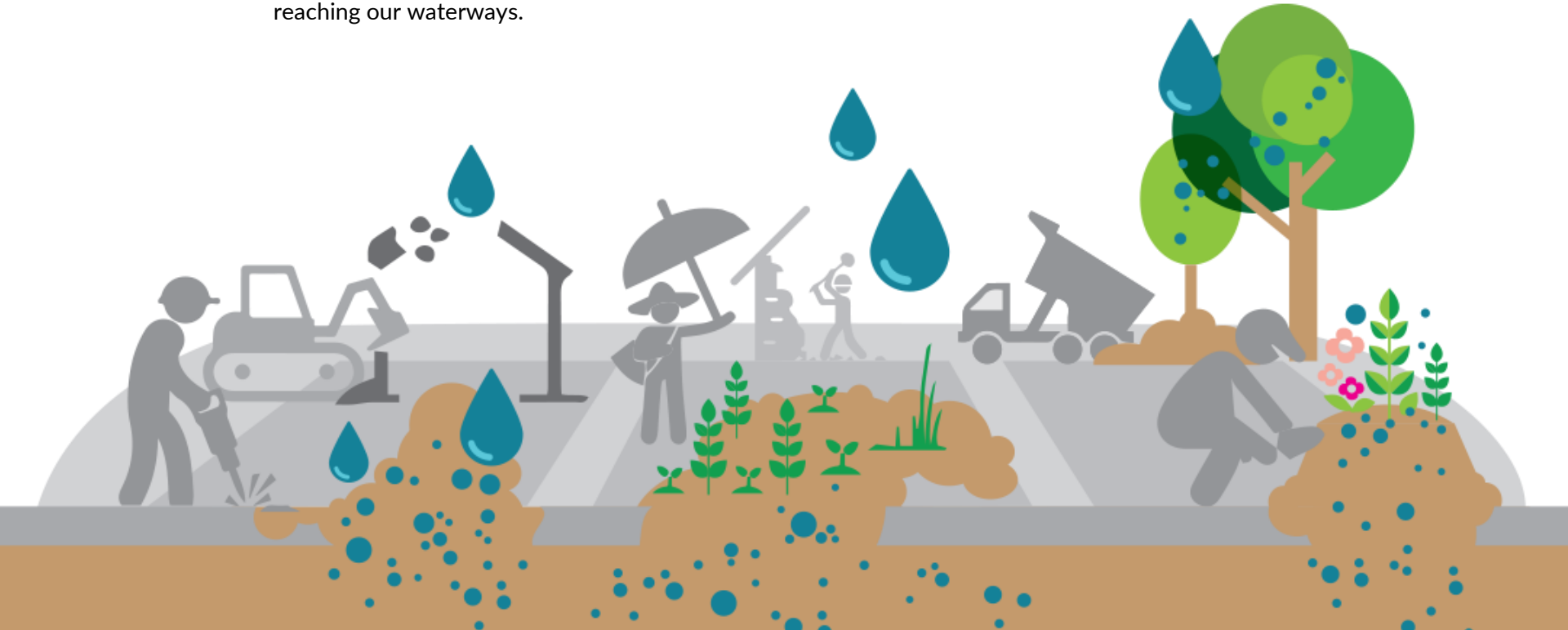


6,681 demolitions including 224 green-post demolitions across Buffalo

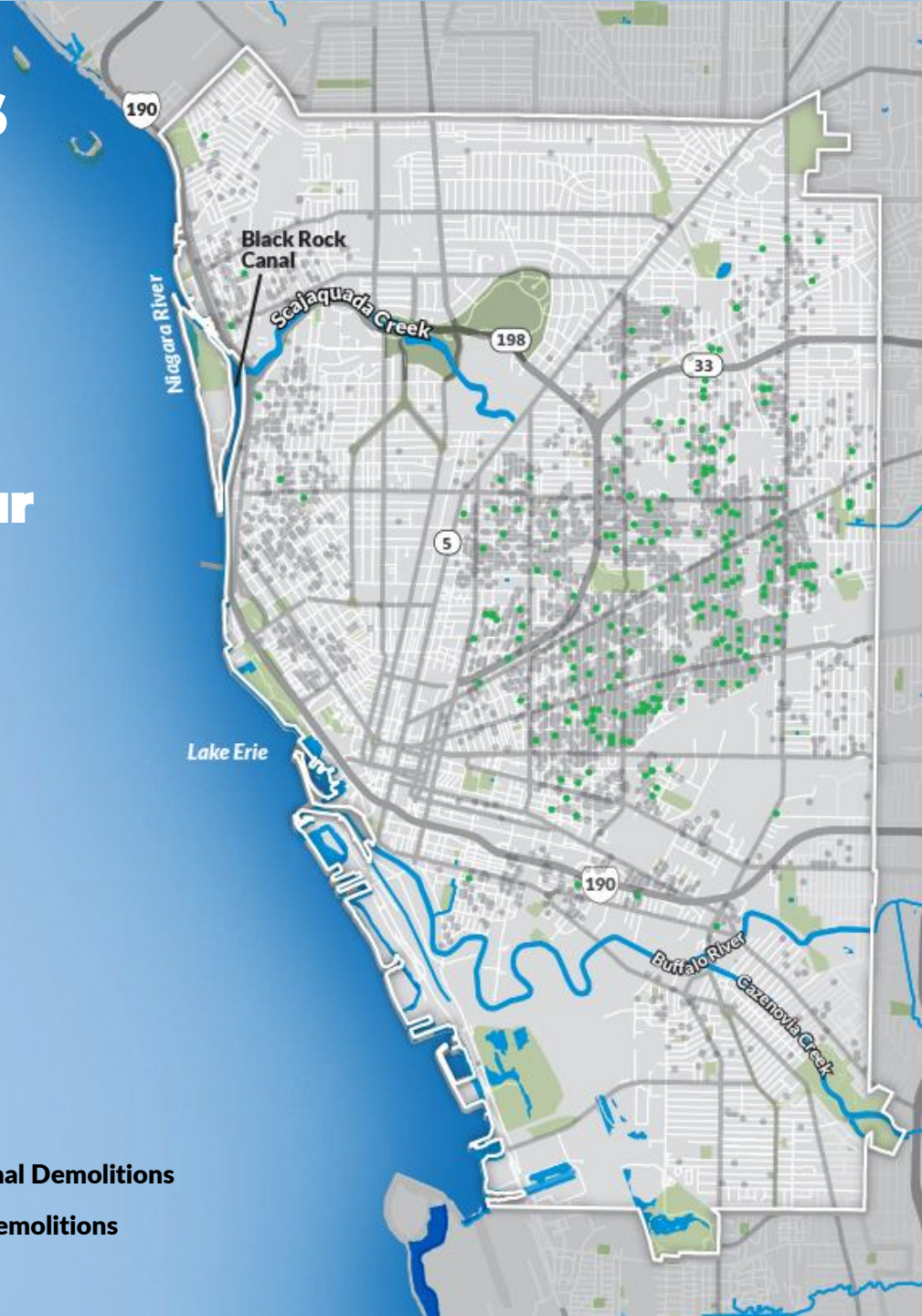
are helping us meet our stormwater challenge

931 acres managed for stormwater

628 acres of impervious surfaces reduced

14,650,161

gallons of runoff prevented from entering the sewer system in a typical rainfall event.



Traditional Demolitions

14,356,650

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

5,949 blighted and unsafe homes replaced with greenspace

732 blighted and unsafe commercial buildings cleared

627.6 acres of impervious surfaces removed

Green Post-Demolition Program

293,511

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

224 post-demolition sites with green treatments

13.3 acres of impervious surfaces removed

Downspout Disconnections and Rain Barrels

Keeping the stormwater challenge in check

Downspout Disconnections

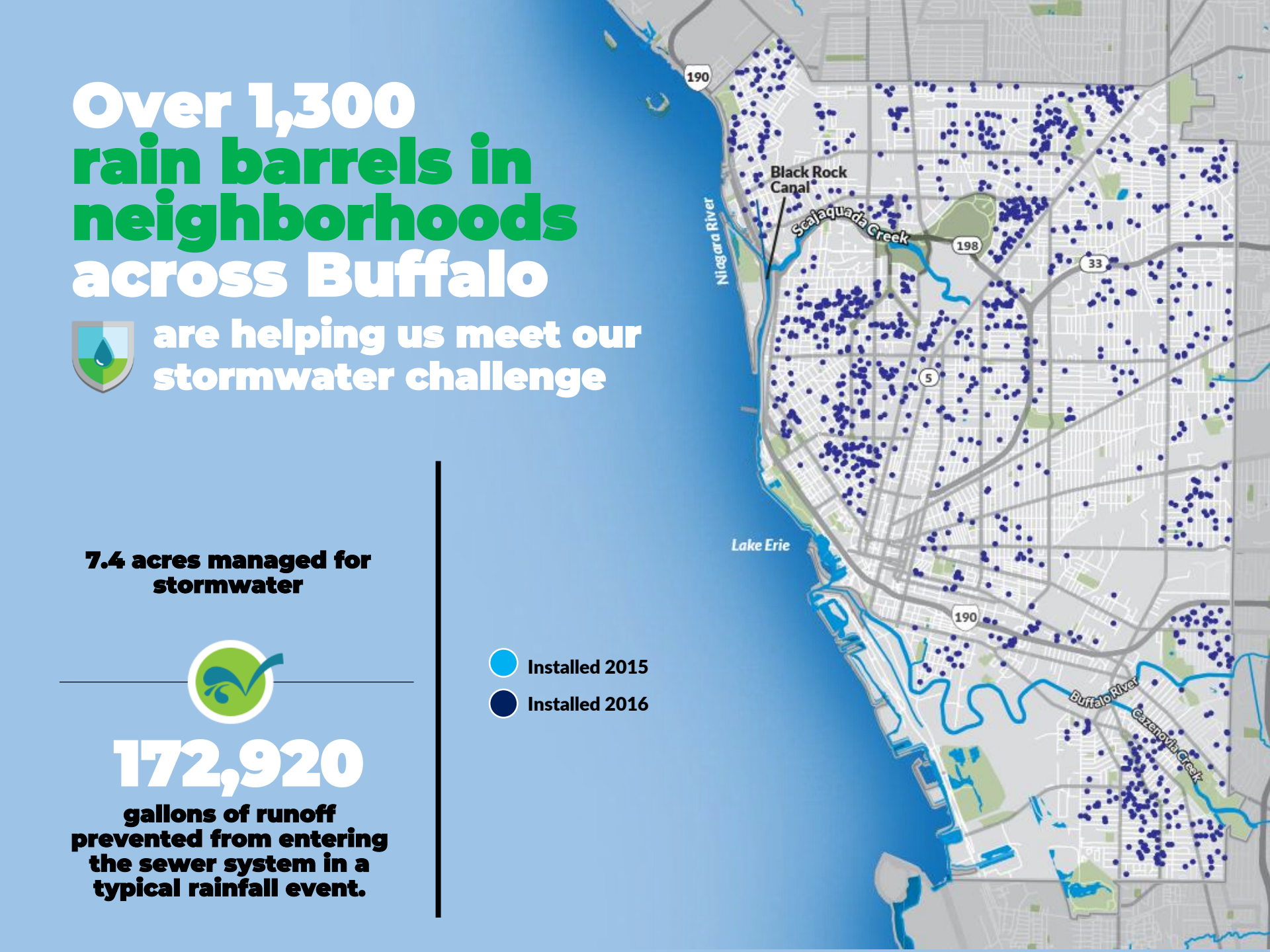
Downspout disconnections redirect water that would otherwise flow into the sewer system into alternative water collection systems, like lawns, flower beds, or specially designed infiltration systems and rain gardens.

Rain Barrels

Rain barrels capture and store stormwater runoff to be used for outdoor household needs. Though not safe for drinking, this water can be used for other activities that would normally require using the tap, like watering plants or washing cars.

Over 1,300 rain barrels in neighborhoods across Buffalo

are helping us meet our stormwater challenge



Installed 2015

Installed 2016

7.4 acres managed for stormwater

172,920

gallons of runoff prevented from entering the sewer system in a typical rainfall event.

Rain Barrel Program

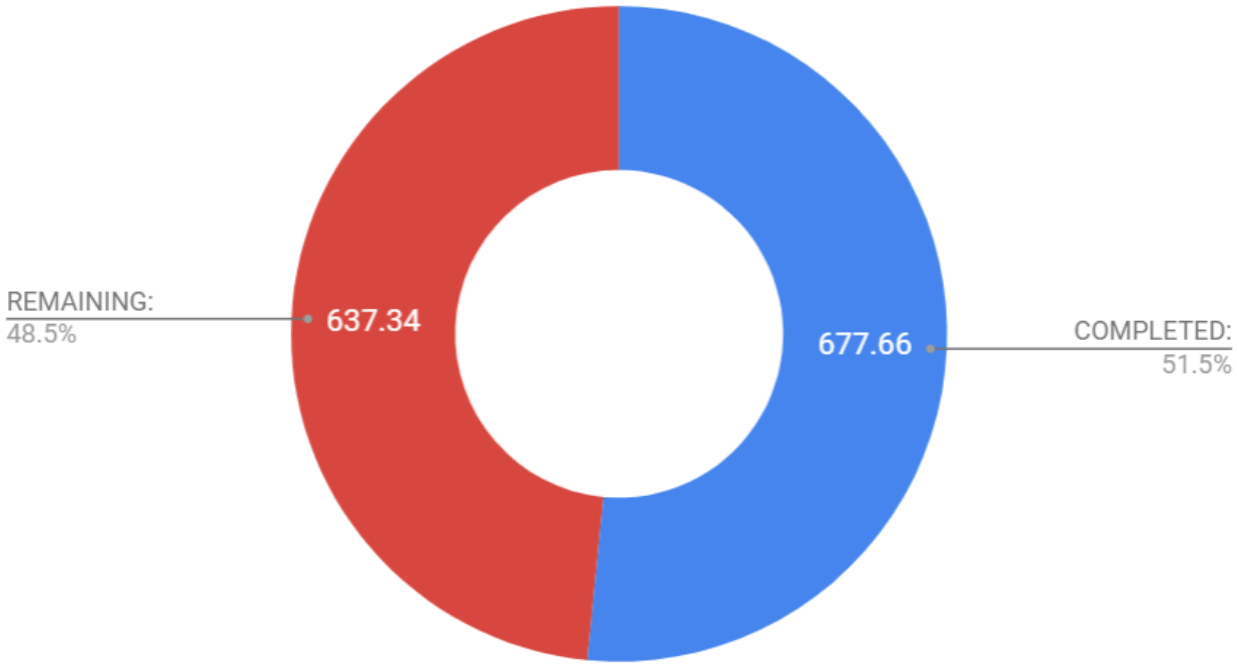
1,310 Rain Barrels

Each rain barrel has a capacity of storing 132 gallons of stormwater at one time

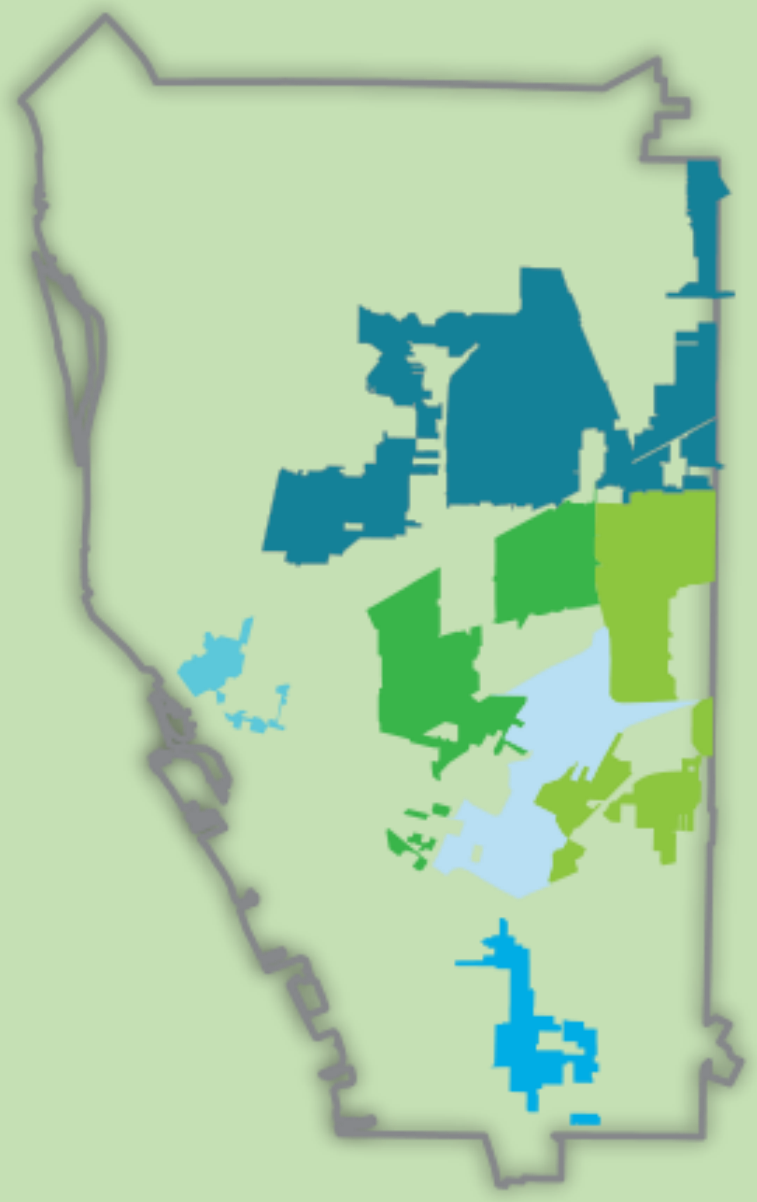
Green Infrastructure LTCP Progress

Impervious Acres Managed

(Includes both completed and in-construction projects)



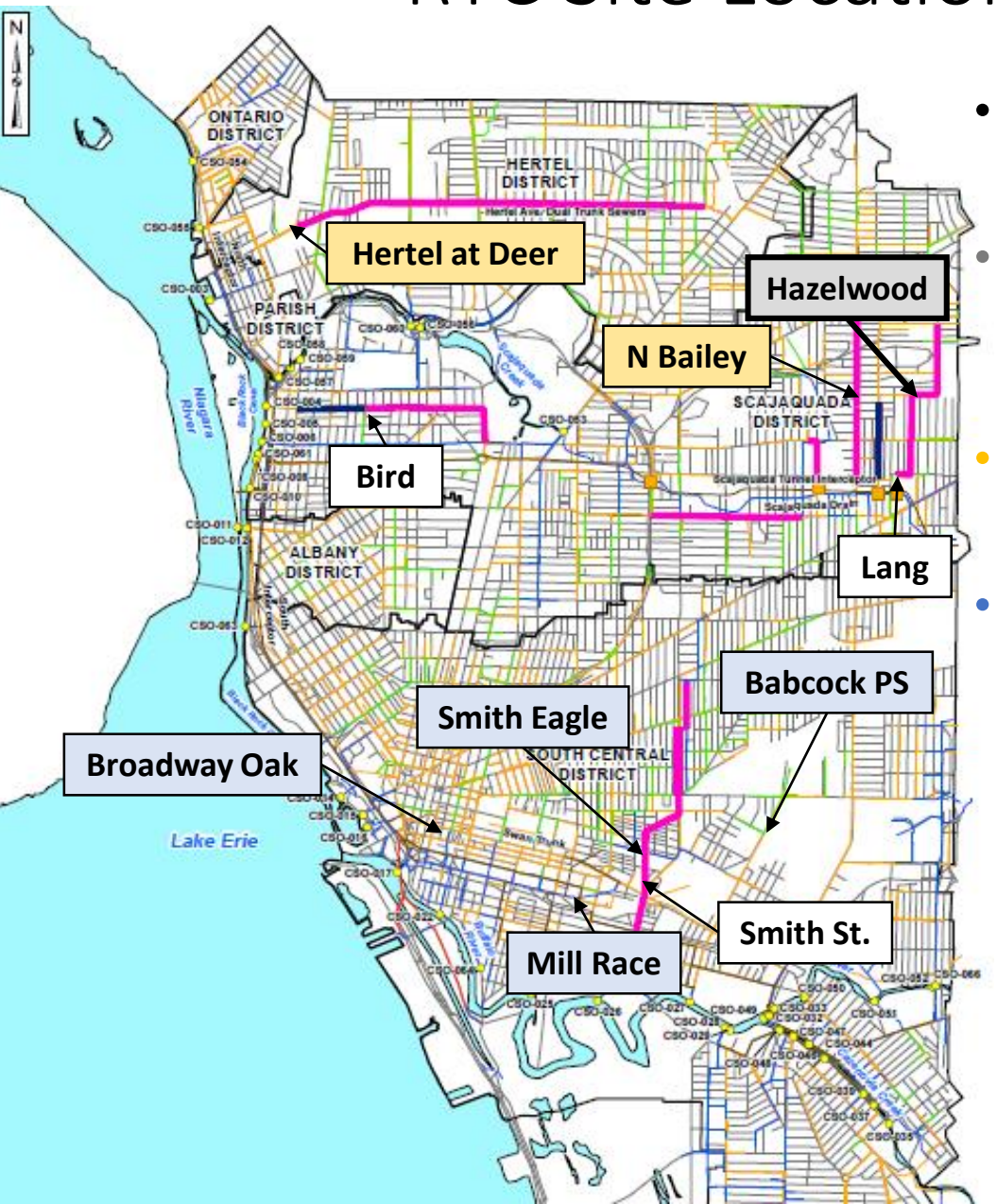
We are exploring partnerships to grow green opportunities in these six geographies.



Next up for LTCP Projects

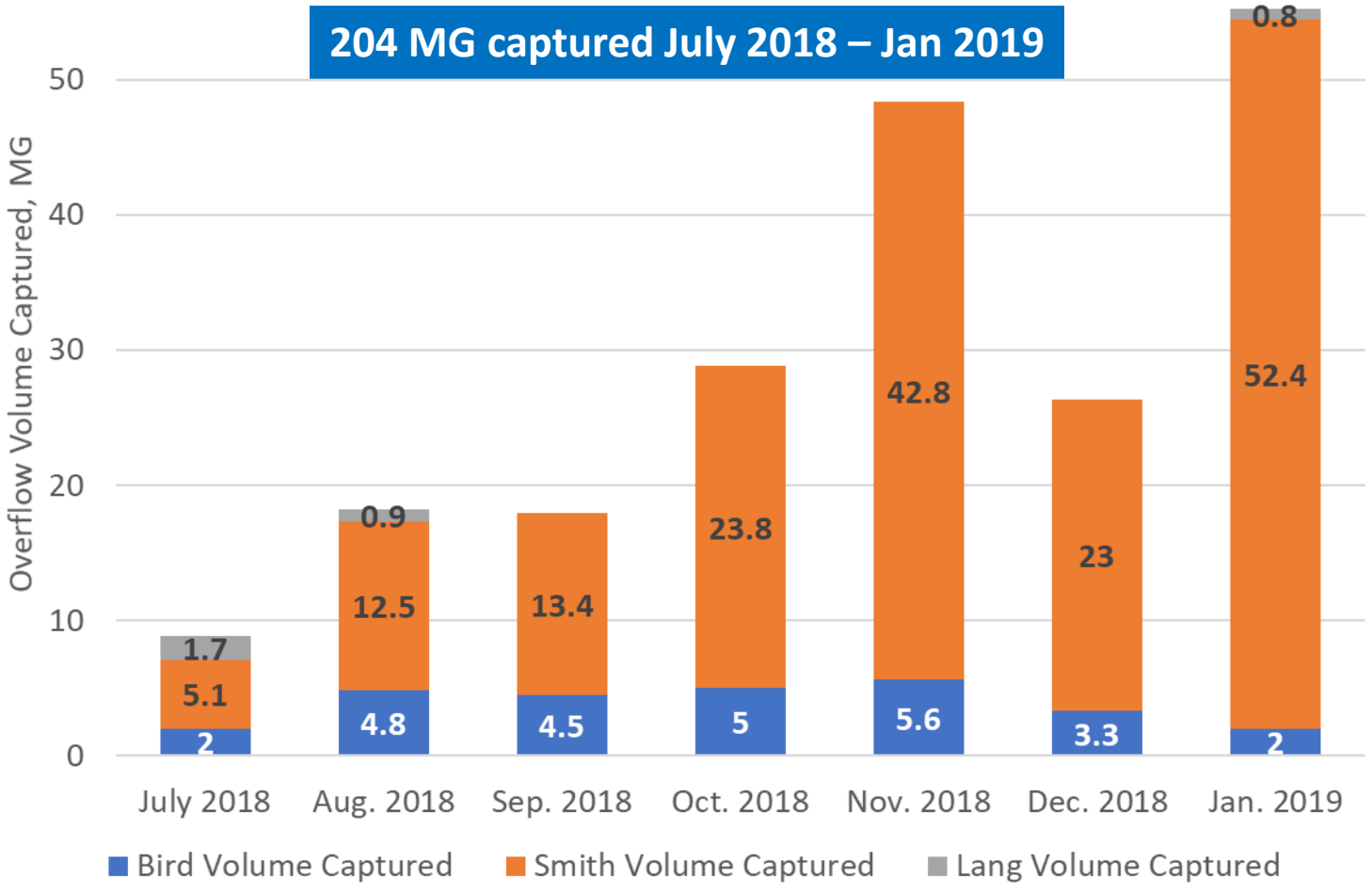
- Currently in year 6 of the LTCP
- Continuing with build out of Real Time control Projects
- Satellite storage is next on the horizon
- Financial incentives to private property owners for green infrastructure

RTC Site Locations and Status



- **In Service:**
  - Smith St, Lang, and Bird
- **Completed, undergoing tuning:**
  - Hazelwood – coordinates with Lang's operations
- **In Construction:**
  - North Bailey and Hertel at Deer
- **In Design:**
  - Broadway Oak, Mill Race, and Smith Eagle, Babcock PS

Installed Site Performance



Note: Lang was in manual open mode September 2018 – early January 2019 to protect Hazelwood construction site upstream

Raincheck – BSA green infrastructure

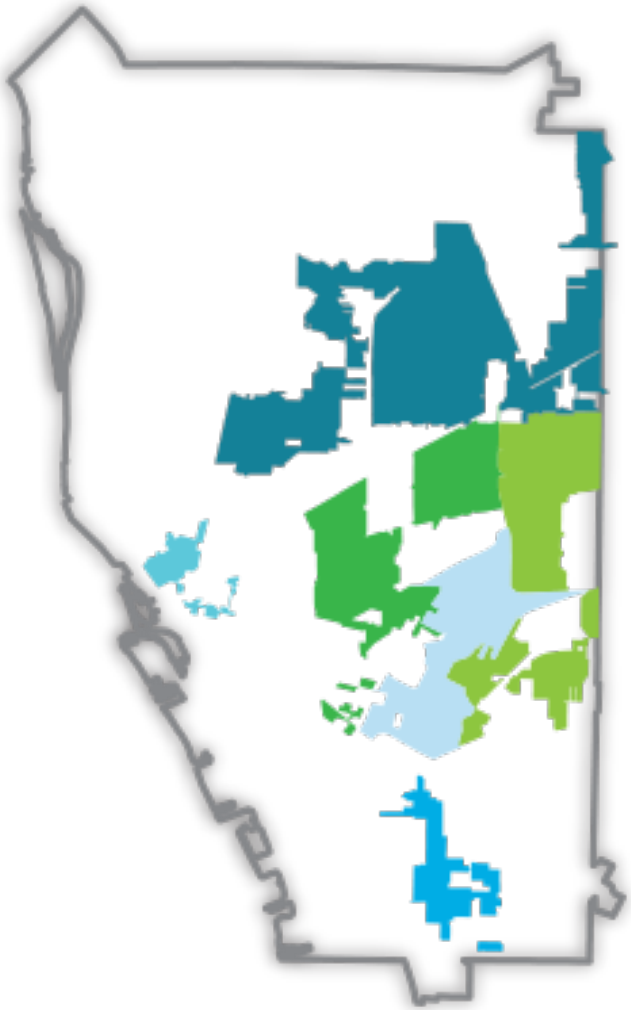
Kevin Meindl,
Green Infrastructure Program Manager

BUFFALO SEWER AUTHORITY

David Barnes, P.E. – Principal Engineer/Project Manager,
John Salvagno, E.I.T,
Arcadis – Buffalo, NY

ARCADIS Design & Consultancy for natural and built assets

RAIN CHECK 2.0



6 Sewer Basins Prioritized

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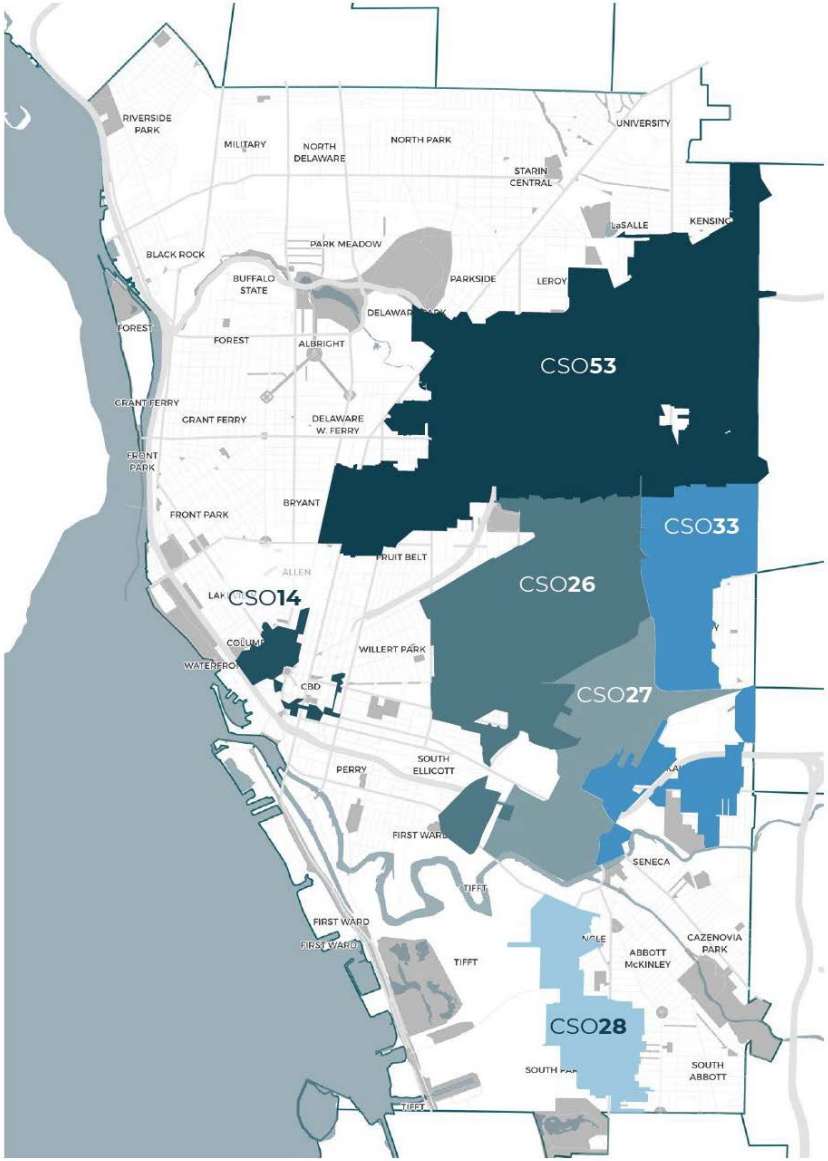
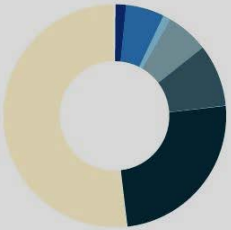
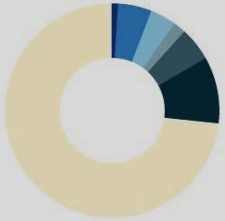


CSO53
CSO33
CSO28
CSO27
CSO26
CSO14



48%
of Buffalo's population lives in the six priority basins



26%
of Buffalo's land area is within the six priority basins

SEAL OF THE CITY OF BUFFALO

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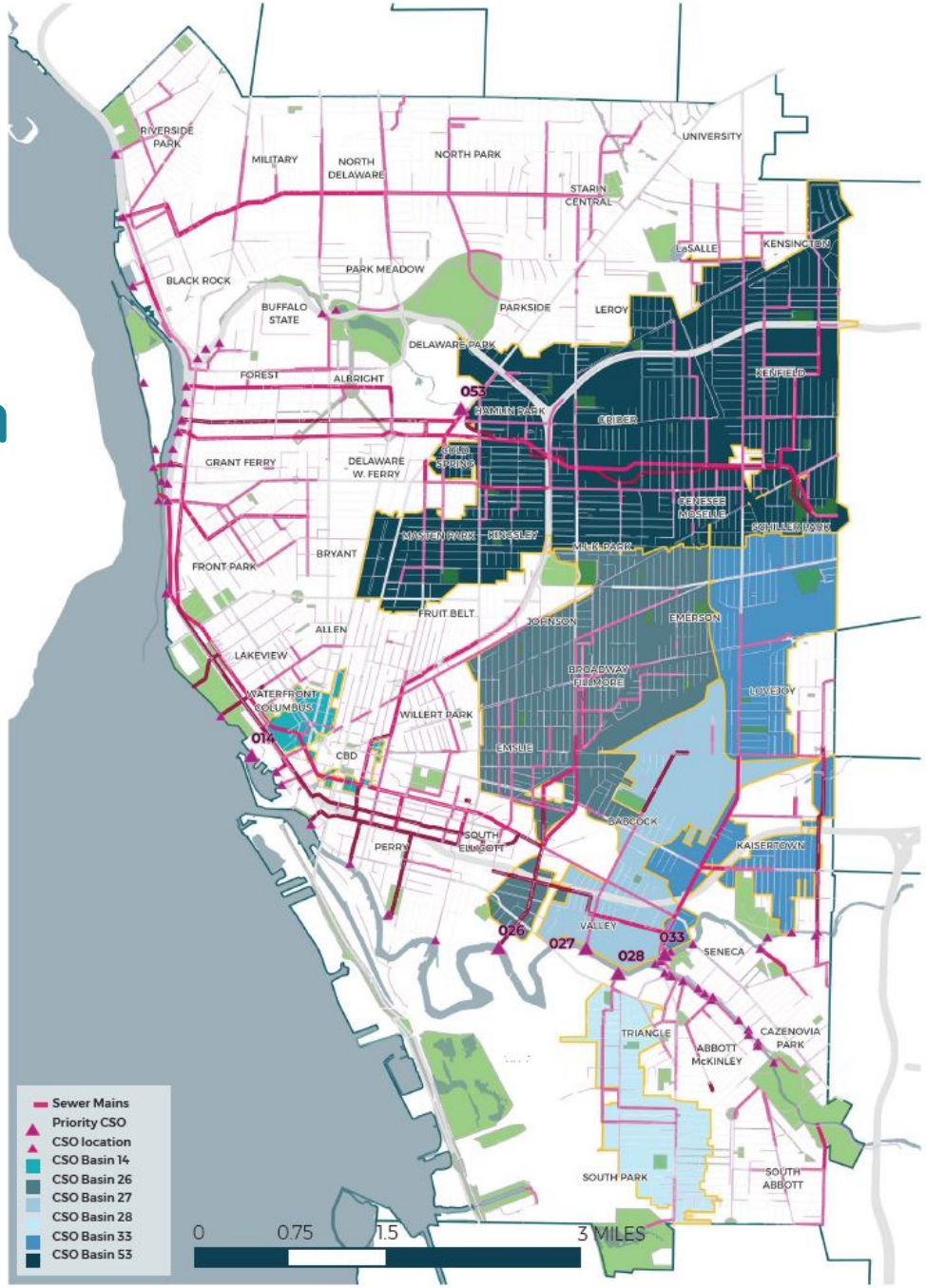
Collection System



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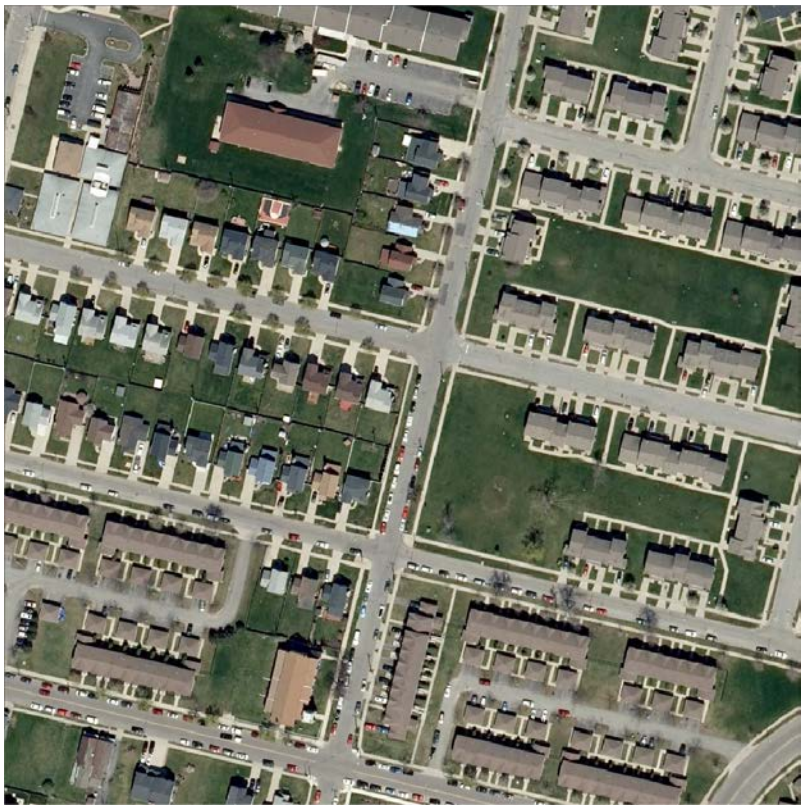
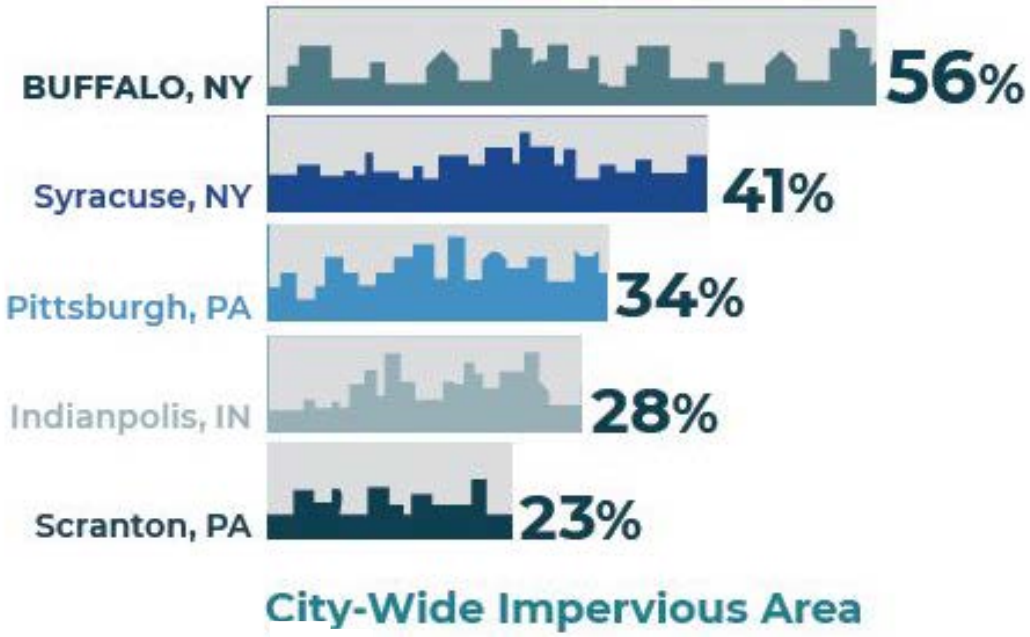
Impervious Area



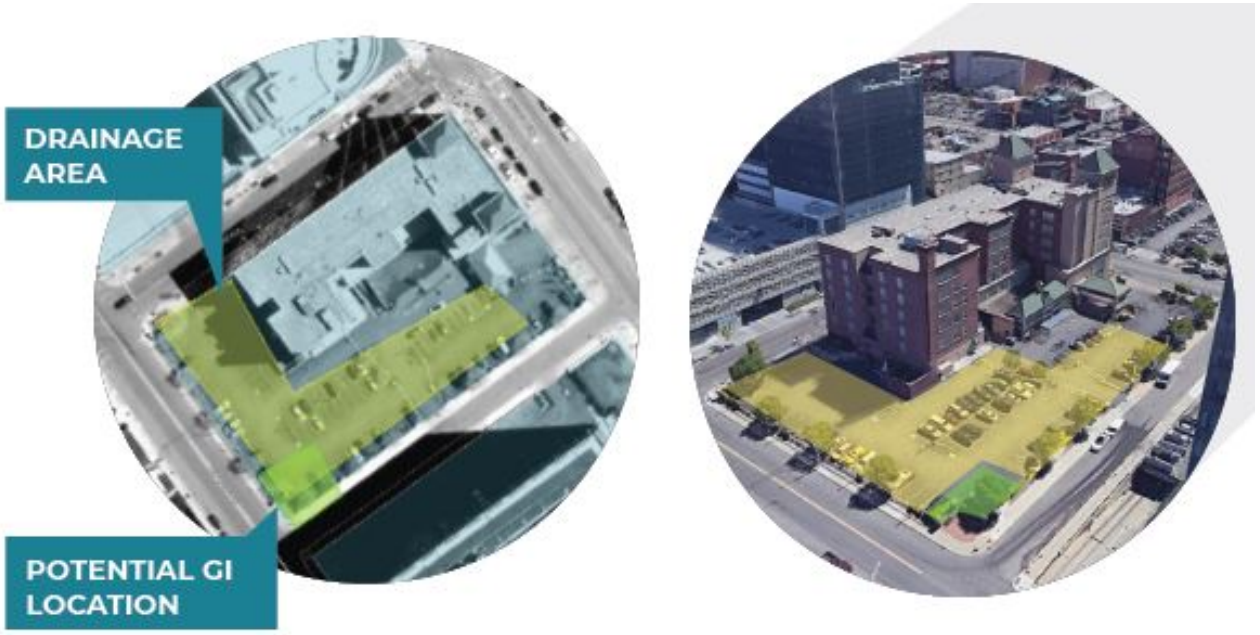
Remote Sensing: NDVI as proxy for pervious area

Impervious Area



BUFFALO SEWER AUTHORITY

Finding Green Infrastructure Opportunities

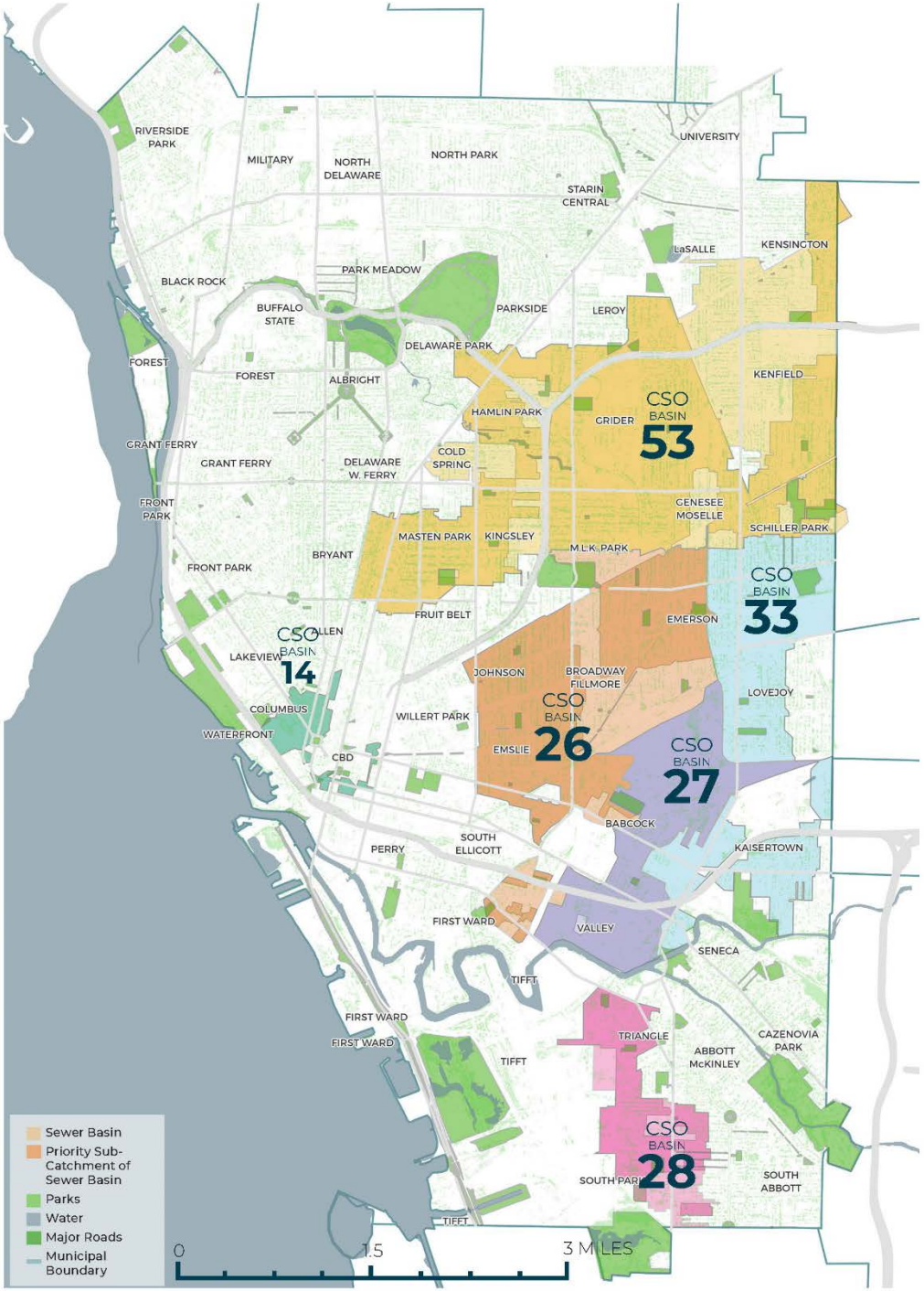


Retrofit Reconnaissance Investigations (RRI)

- Desktop Analysis
- Field Work to Identify Appropriate Retrofits
- Conceptual Sketches
- Use the Center for Watershed Protection's RRI Form
- CSO Basin Considerations:
  - Large areas needed
  - Clustered retrofits may be appropriate

RRI Desktop Analysis

- Total Area in 6 CSO Basins: 6,827 acres
- Target is 569 acres of Impervious Cover
- Sites selected by parcel
- Criteria include:
  - Impervious Cover
  - Land Ownership
  - Permeability
  - Area/Size
  - Partnership Organizations

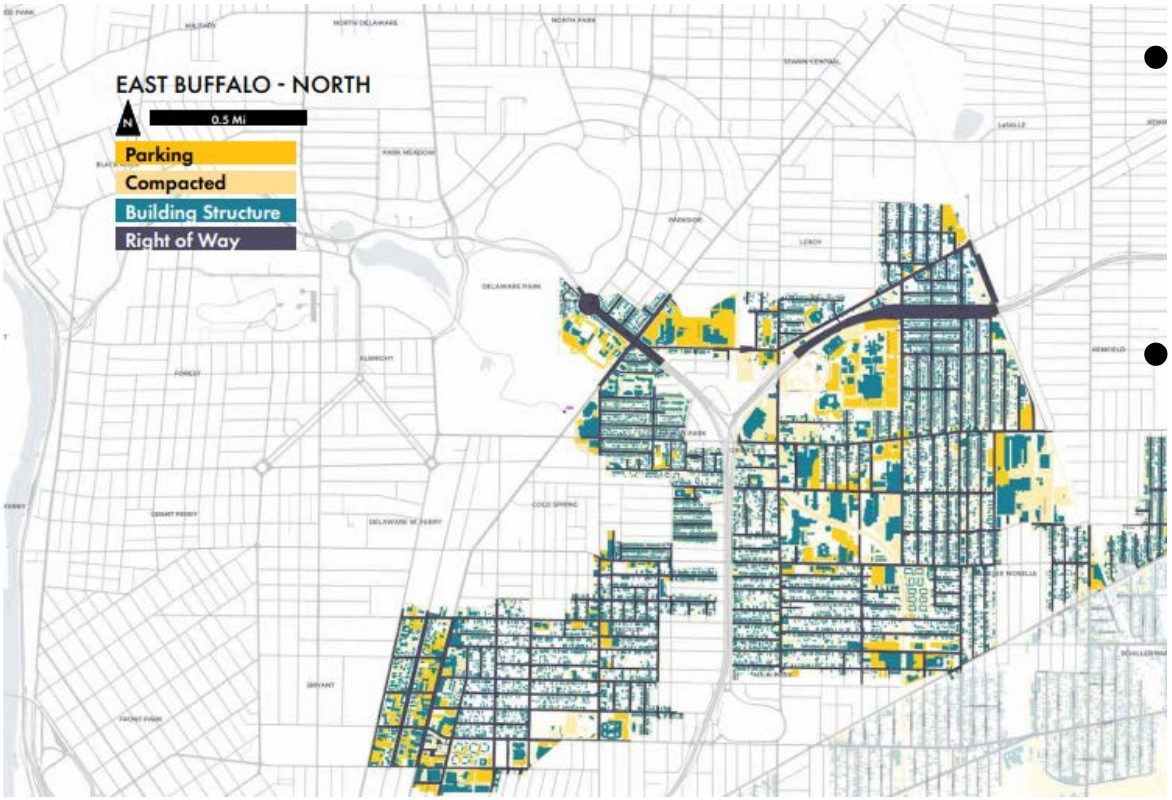


Screening Criteria

Criteria	Description
Parcel Size	Above 0.5 acres, unless special considerations exist.
Previous Land Use Planning Documents	Areas already highlighted in previous reports for economic and/or community benefit.
Input from Engagement Meetings	Including Buffalo Public Schools, BURA/BUDC, Community Service Buildings, etc.

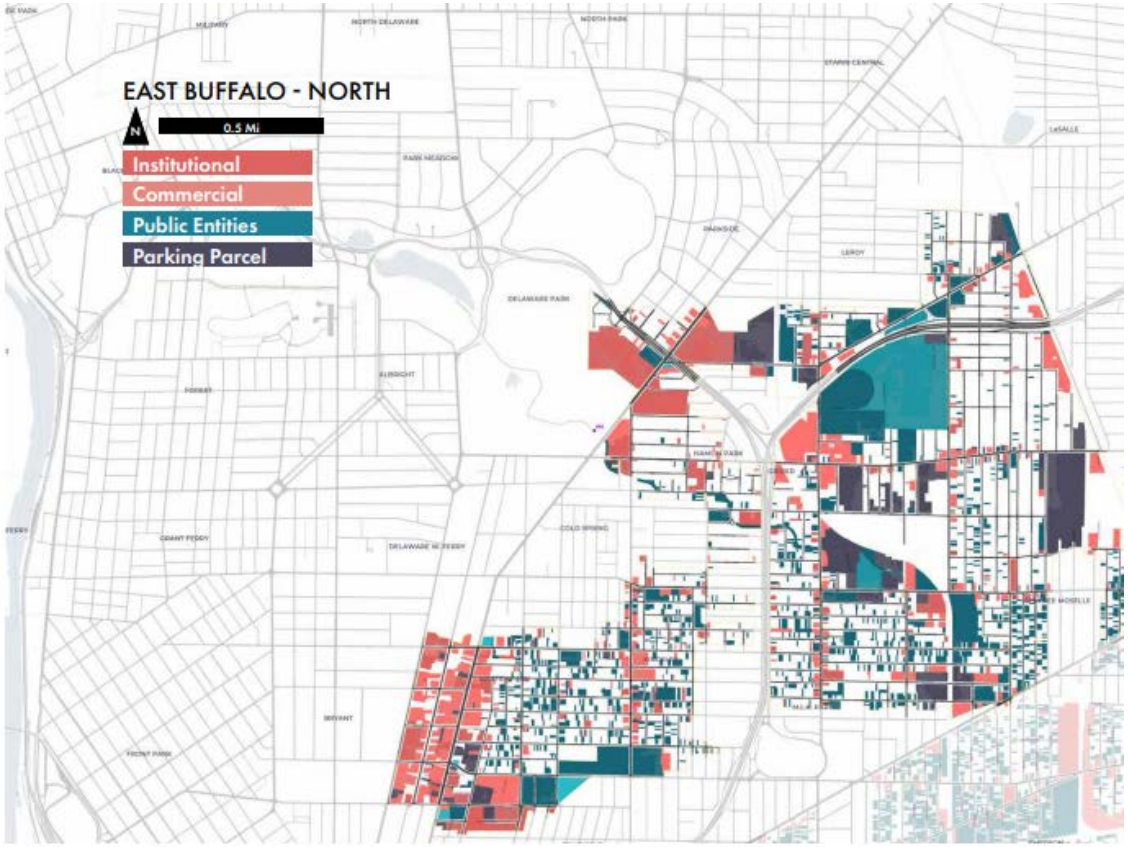
CSO 14 Planning Area

Retrofit Site Selection: Permeability



- Criteria: Sites that can be made permeable.
- Areas Identified:
  - Compacted open space
  - Parking lots
  - Building Structures

Retrofit Selection: Ownership



- Identify ownership by category as a screening factor
- Identify specific public partners for implementation and engagement

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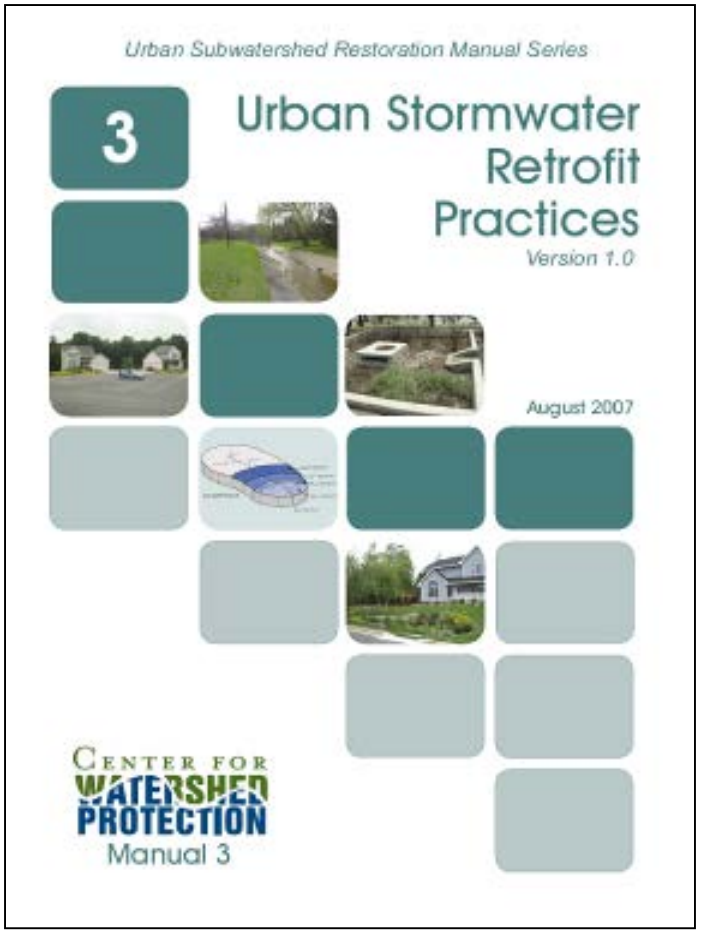
Urban Stormwater Retrofit Practices

- Resource for stormwater retrofitting
- Information on:
  - Retrofit locations
  - Stormwater retrofit practices
    - Pollutant removal performance
    - Cost
  - Retrofit process



RRI Form: Modifications

- Start from BSA Retrofit Form
- Some additional fields from original RRI Form
- Use in a digital format linked with ArcGIS

APPENDIX A: BUFFALO SEWER GI Retrofit Reconnaissance Investigation

Date:		Sewershed:	
Site Name:		Total Site Size:	
Street Name:		Street Number:	
Owner:		Land Use:	
Key stakeholders:		Timing Considerations:	☐ Urgent/Time sensitive ☐ Mid Term ☐ No time constraints
Proposed Maintenance Entity		Collaboration Opportunities:	☐ Design ☐ Construction ☐ Maintenance ☐ Funding ☐ Other
Proposed Surface for Mgmt:	☐ Right of Way ☐ Roof ☐ Parking lot ☐ Walkway/Patio ☐ Turf ☐ Other	Size of Area to be managed:	Length: _____ Feet Width: _____Feet Total Area: _____Sq. Ft Total Area: _____ Acres Gallons (1" rainfall) _____
Soil Type:	☐ Clay ☐ Sand ☐ Loam ☐ Other	Potential Site Constraints/Challenges	☐ Foundation Buffer: _____ ☐ Contamination: _____ ☐ Property Lines: _____ ☐ Utilities: _____
Slope	☐ Flat ☐ Moderate Slop ☐ Steep Slope	Vegetation	☐ Grassy/Turf ☐ High Grasses/weeds ☐ Shrubs/trees
Light	☐ Sunny ☐ Mixed Sun/Shade ☐ Shade	Visibility	☐ High ☐ Some ☐ Low/Hidden
Proposed Retrofit Type	☐ Pavement removal ☐ Demolition ☐ Bioretention/rain gardens ☐ Porous Asphalt (location?) ☐ Porous Paving (private only) ☐ Tree Plantings ☐ Other	Preliminary construction cost Estimate	$ _____ Total $ _____ per acre $ _____ per gallon

BUFFALO SEWER AUTHORITY

Retrofit Reconnaissance Investigations

What are Stormwater Retrofits?

Stormwater retrofits are stormwater management practices in locations where stormwater controls did not previously exist or were less effective.

Parking Lots

- Large expanses of impervious cover
- It may be possible to capture runoff at the edges
- If space is available, can implement practices in the medians
- May use permeable pavement
- Can also recommend reducing pavement size

Retrofit Inventory: Field Work

- Investigation of more than 450 sites during August and September
- Teams from PUSH, Arcadis and CORE Environmental
- Focus: Impervious area capture, education opportunities

ARCADIS

Project Photographs

BSA Raincheck 2.0
RRI Photographs

Photo: 5 View Looking West

RRI Location #: CSO 14-1

Description: 234 Main St
Main-Seneca Parking Lot

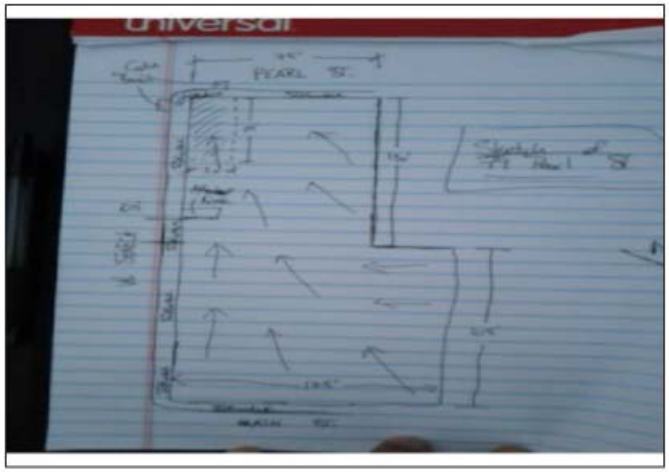


Photo: 6 Sketch

RRI Location #: CSO 14-1

Description: 234 Main St
Main-Seneca Parking Lot

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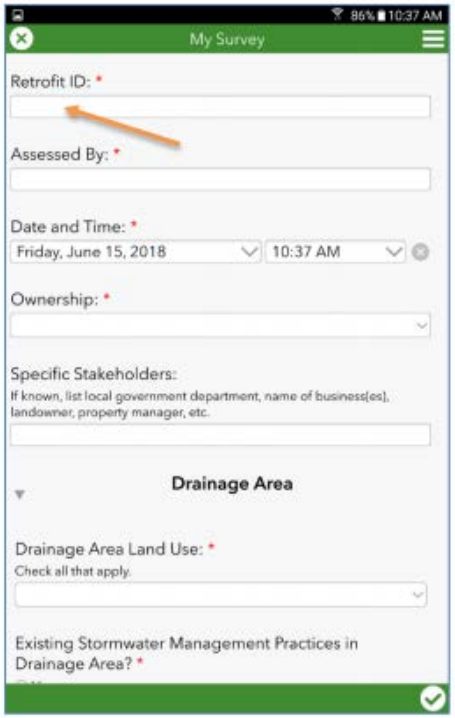
Retrofits: Field Form and Training

- CWP training with Arcadis, Core and PUSH Buffalo
- Field training on use of the RRI
- Digital field form customized for this project



BUFFALO SEWER AUTHORITY

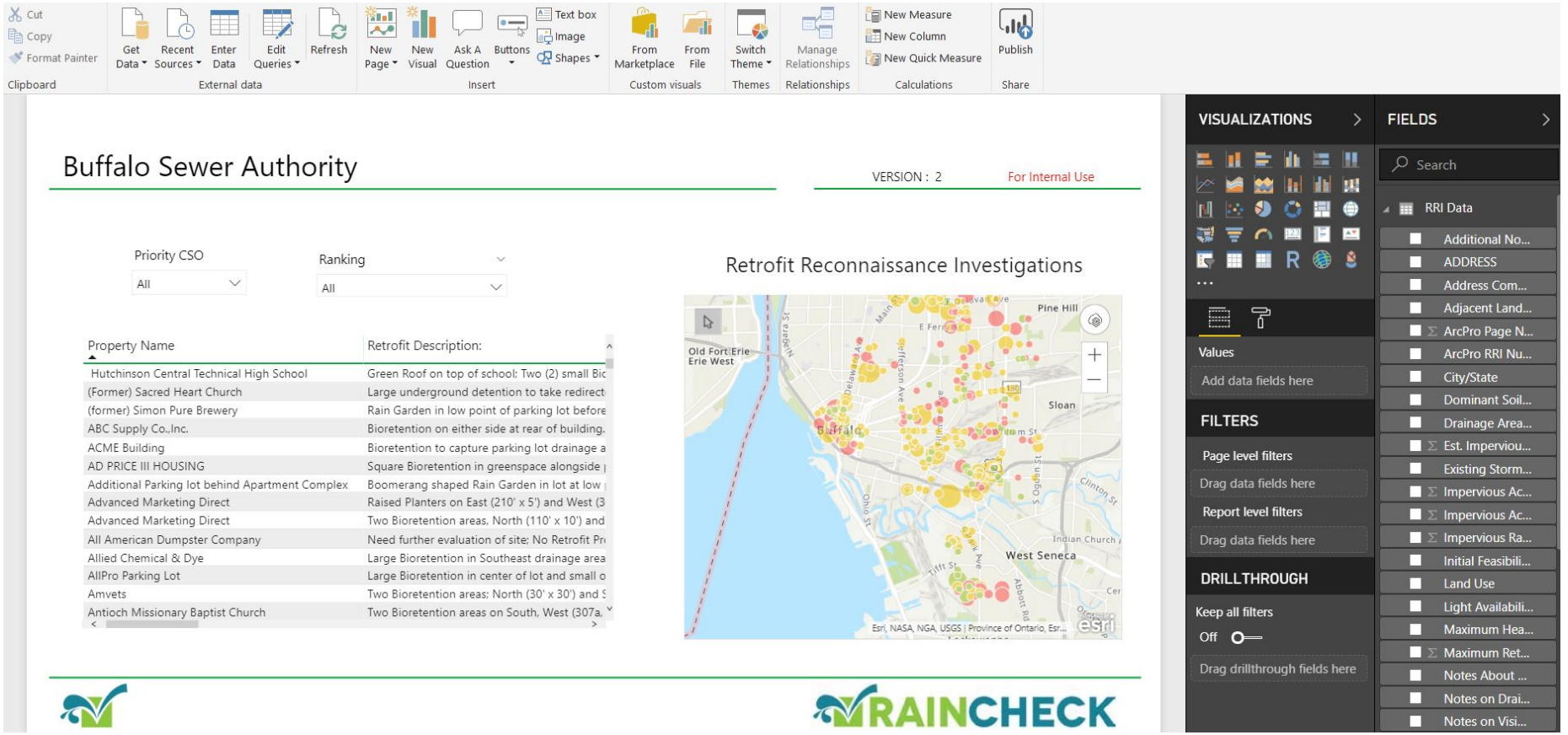
What are we looking for in the field?

- Is there adequate space?
- Are there utility conflicts?
- Is there adequate hydraulic head?
- Is the slope appropriate?
- How does stormwater currently flow at this site?
- Where does the drainage break at the site scale?

BUFFALO SEWER AUTHORITY

Visibility: Does it Provide an Education Opportunity?

RRI Results



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RRI Results – Location Summary Forms

Retrofit # 32

CSO: 14

Address
175 Court Street
Buffalo, NY 14202
District: South Central

Owner Name: Buffalo Fire Department
Land Use: Community Service
Neighborhood: COLUMBUS

Green Infrastructure Types


Parking Bioswales


Rooftop Practice

Retrofit Opportunity

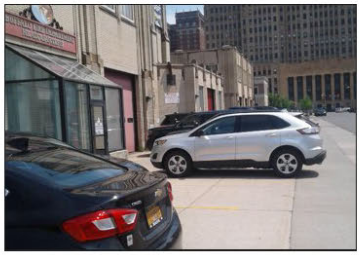
Total Parcel Area: 1.22 Acres
Parcel Impervious Area: 1.22 Acres
Receiving Waterbody: Erie Basin
CSO Impervious Ranking: 24
Maximum Head Available: 10 Feet
Retrofit Location: Landscape/Hardscape,Rooftop
Retrofit Practice: Bioretention or Rain Garden
Retrofit Drainage Area: 0.68 Acres (all retrofits)
Retrofit Practice Area(s):
Retrofit #1: 3084 SF Retrofit #2: 1054 SF
Retrofit #3: 5245 SF Total: 9383 SF
Retrofit Practice Dimensions:
Retrofit #1: 302'x 10.2' Retrofit #2: 136' x 7.8'
Retrofit #3: 481' x 10.9'
Retrofit Description:
Small bioretention along 7th, green roof on top of main building, green roof on top of dispatch building.
Notes on Drainage Area:
Rooftop area and some sidewalk and street drainage
Light Availability: Sunny
Visibility: Medium Visibility
Annual Air Quality PM10 Removed:
Retrofit #1: 1.3 lbs Retrofit #2: 0.46 lbs
Retrofit #3: 2.3 lbs Total: 4.1 lbs
Annual Carbon Dioxide Sequestered:
Retrofit #1: 643 lbs Retrofit #2: 220 lbs
Retrofit #3: 1,093 lbs Total: 1,956 lbs
Annual Air Quality Ozone Removed:
Retrofit #1: 1.5 lbs Retrofit #2: 0.51 lbs
Retrofit #3: 2.5 lbs Total: 4.6 lbs

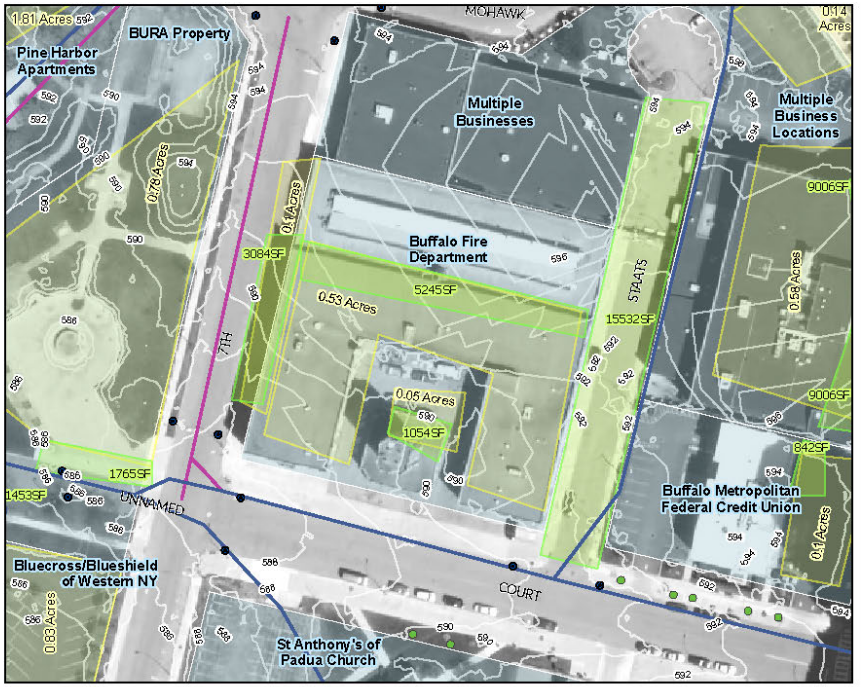
CSO Information

CSO Target Reduction: 12.9 Acres
CSO Total Area: 152.5 Acres

Site Information

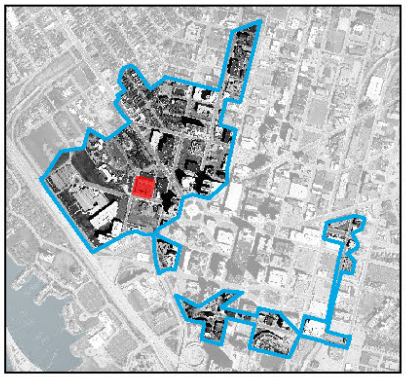
Drainage Area Land Use: Institutional
Potential Site Constraints: Difficult Access, Utilities
Adjacent Land Use Classes:
Commercial, Institutional, Transport - Related
Utility Constraints: Sewer, Buried Electric, Unknown
Dominant Soil Type: Unknown





RRI Survey
- Proposed Retrofit Practice
- Retrofit Drainage Area
- RRI Parcel
- Combined Sewer
- Interceptor Sewer
- Storm Overflow Sewer
- Storm Relief Sewer
- Sanitary Sewer
- Existing Street Tree
- Catch Basin / Receiver

RRI Reference Location
- Survey Parcel
- CSO Boundary

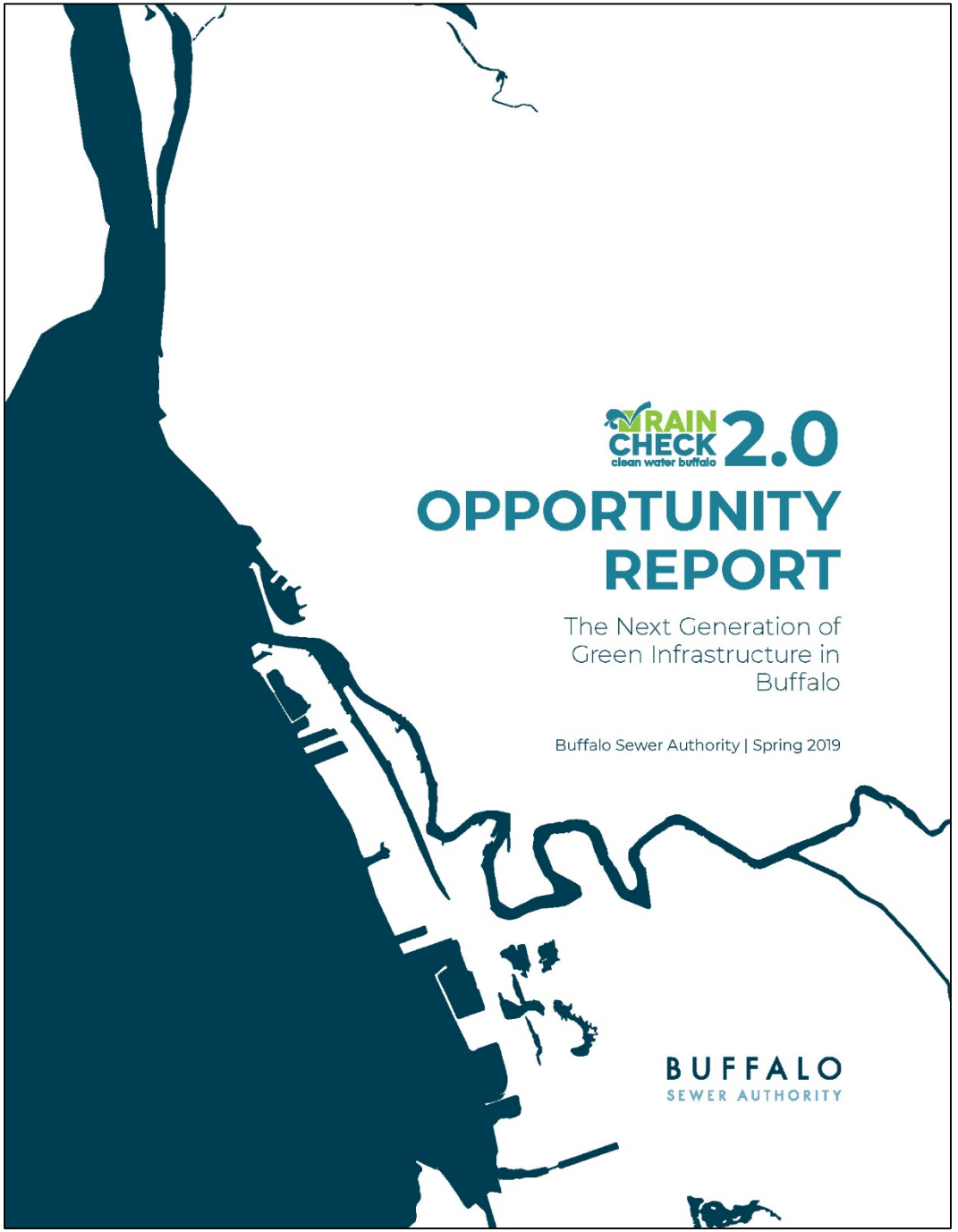


RAINCHECK

RRI Review Workshops

- Review and Discuss CSO Basin Characteristics
  - Tree Canopy
  - Urban Character
  - Equity Considerations
  - Potential Partners
  - Key neighborhood groups
  - Key Corridors
  - Identify Opportunities – "Clusters" or "Networks"

RAIN CHECK
clean water buffalo



RAIN CHECK clean water buffalo 2.0

OPPORTUNITY REPORT

The Next Generation of Green Infrastructure in Buffalo

Buffalo Sewer Authority | Spring 2019

BUFFALO
SEWER AUTHORITY

Opportunity Sites & Networks

Corridors

In CSO Basin 53 corridor green infrastructure will be critical to meeting the stormwater goal. The predominance of large corridors in this basin allows for the organization of green infrastructure into larger networked system, increasing the overall potential effectiveness of green infrastructure in the basin. The Scajaquada Creek corridor also presents the opportunity to incorporate Buffalo's water history into green infrastructure and make underground infrastructure visible. Adding a cap park to the Scajaquada expressway would provide an opportunity for both green infrastructure and neighborhood connectivity.

Sites

The sites inventoried for green infrastructure retrofit in CSO Basin 53 focused on businesses and large institutional campuses as well as community partners institutions. These sites are organized along many key corridor or grouped in industrial or commercial areas.

Clusters and Networks

Combining feasible retrofit site, important institutional sites and corridors reveals the existence of key clusters within CSO Basin 53, anchored by important institutions. In addition to physical proximity, the presence of community institutions provides the opportunity for clusters to have a programmatic focus, such as workforce development, community health, or economic development.

Key Corridors

- Kensington Ave.
- Michigan Ave.
- Jefferson Ave.
- Northland Ave.
- Fillmore Ave.
- Genesee Street
- Main Street
- Grider Street
- Ferry Street
- Delevan Avenue
- 33 Expressway

Key Businesses

1. OSC Manufacturing and Equipment Services
2. Buflovak LLC
3. BUDC Redevelopment
4. Milk-Bone Plant
5. Indigo Productions
6. Erie County Medical Center (ECMC)

Key Institutions

7. Sisters of Charity Hospital
8. Medaille College
9. Canisius College
10. St. Stanislaus Church
11. True Bethel Baptist Church
12. City Honors School
13. Seneca Vocational High
14. Erie County Medical Center

CORRIDORS are networked, physically connected systems around a road or right-of-way

OPPORTUNISTIC SITES are stand alone sites with a high opportunity for green infrastructure

CLUSTERS have an anchor institution or are groups of parcels that can implement similar strategies

NETWORKS are larger system of capture and treatment incorporating many sites

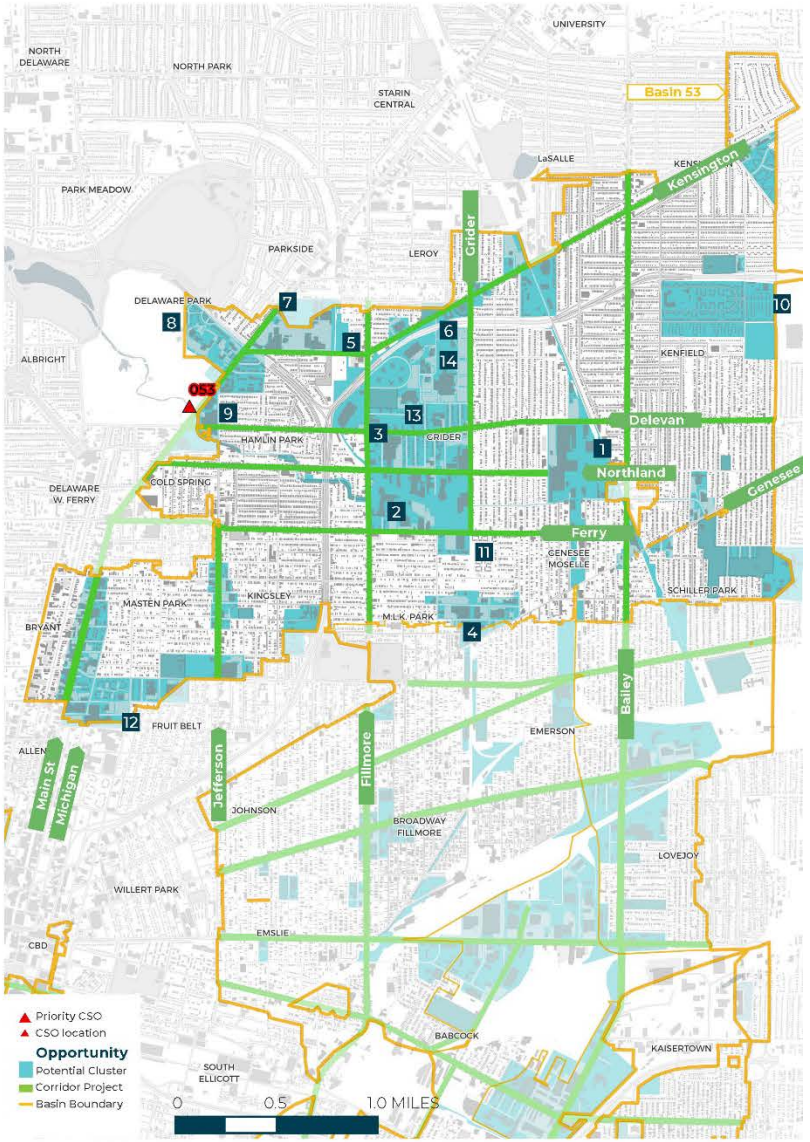


Figure 1.102: CSO Basin 53 Green Infrastructure Opportunity Sites

SEAL OF THE CITY OF BUFFALO

BUFFALO SEWER AUTHORITY

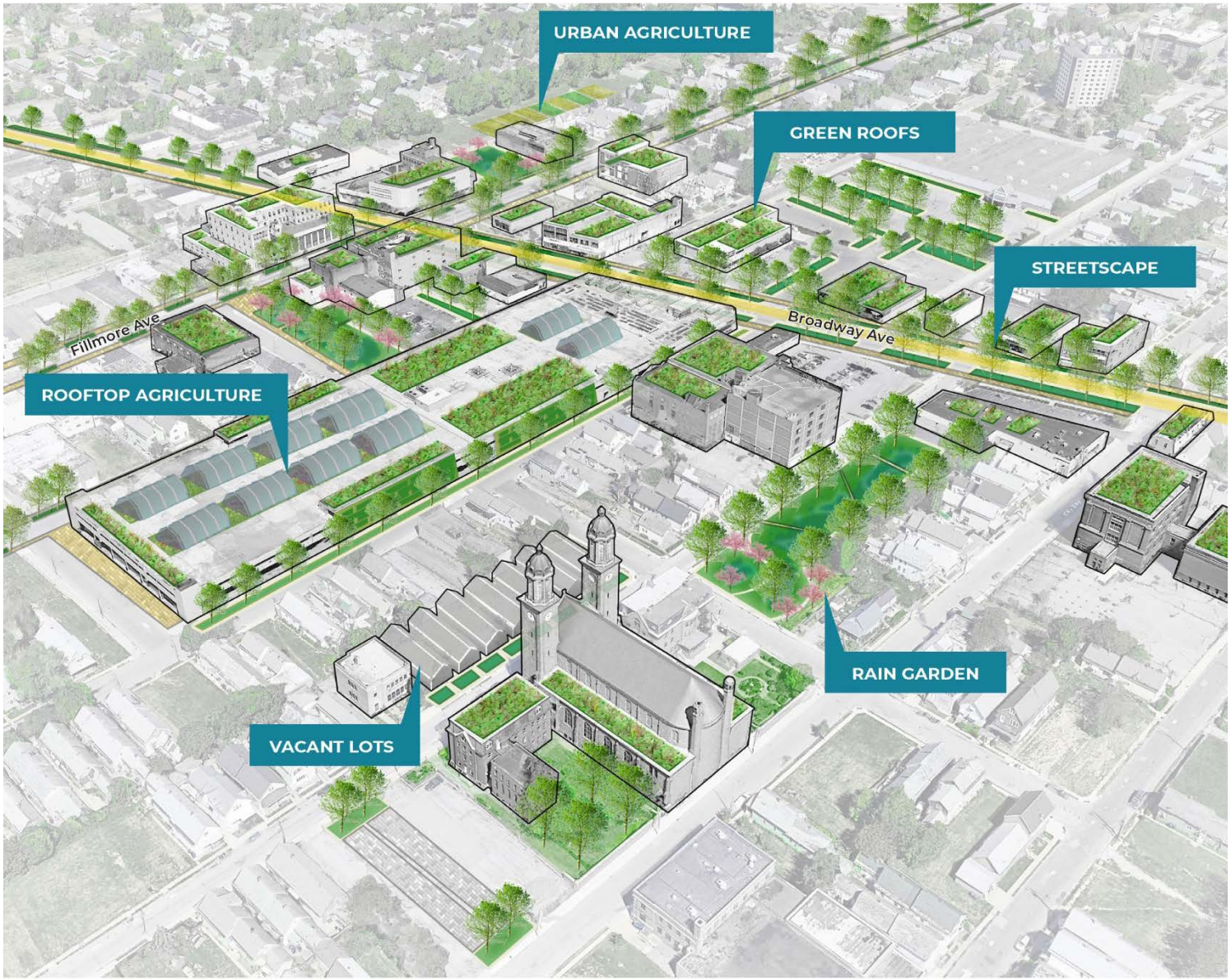


Figure 1.36: Rendering of Green Infrastructure at Fillmore and Broadway

Next Steps

Continue to engage with all members of our city.

RAINCHECK 2.0

Green opportunities are everywhere.

Let's find them together.

Visit raincheckbuffalo.org to learn more

Questions

Attachment D to the Semi-Annual Status Report: September 2019

Certificates of Acceptance and Occupancy

ITEM NO. 25

CERTIFICATE OF ACCEPTANCE AND OCCUPANCY - CONTRACT NO. 81800019

PROJECT:	Bird Avenue Underflow SPP 13 Modifications Project
BID:	$1,729,120.00
CONTRACTOR:	Kandey Co., Inc. 19 Ransier Drive West Seneca, NY 14224
WHEREAS:	The Principal Sanitary Engineer and staff have certified that the Contractor completed the work in accordance with the plans and specification on December 11, 2018; and
WHEREAS	In Item No. 32, on September 26, 2018 the contract value was increased by $197,852.00.
WHEREAS	In Item No. 24, on March 6, 2019 the contract value was decreased by $110,050.58.
NOW THEREFORE BE IT RESOLVED:	That the Board of the Buffalo Sewer Authority hereby finds and determines that:

a. The work to be performed under the terms of the Contract has been complete and is accepted;

b. The date of entrance and occupancy be fixed as of December 11, 2018;

c. The maintenance period commence on December 11, 2018;

d. The final cost of the Contract is $1,816,921.42.

MOTION TO APPROVE

MADE BY MS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of March 6, 2019

ITEM NO. 35

CONTRACT NO. 81800016

CERTIFICATE OF ACCEPTANCE AND OCCUPANCY

PROJECT: Hazelwood RTC In-Line Storage Structure

BID: $1,238,000.00

CONTRACTOR: STC Construction Inc.
PO Box 459
Springville, NY 14141

WHEREAS: The Principal Sanitary Engineer and staff have certified that the Contractor completed the work in accordance with the plans and specifications on June 19, 2019; and

WHEREAS In Item No. 32, at the June 19, 2019 Board Meeting, the contract value was decreased by $37,779.00.

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby finds and determines that:

a. The work to be performed under the terms of the Contract has been complete and is accepted;

b. The date of entrance and occupancy be fixed as of June 19, 2019;

c. The maintenance period commence on June 19, 2019;

d. The final cost of the Contract is $1,203,221.00.

MOTION TO APPROVE

MADE BY MR. KENNEDY

2ND BY MR. ROOSEVELT

AYES 4 NOES 0

Board Meeting of June 19, 2019