



DEPARTMENT OF  
**PUBLIC  
UTILITIES**

March 31, 2023

Mr. Jerome Brooks  
Department of Environmental Quality  
Piedmont Regional Office  
4949-A Cox Rd.  
Glen Allen, VA 23060

***Re: Integrated Annual Report for the City of Richmond Municipal Separate Storm Sewer System (MS4) and the Combined Sewer System (CSS), Permit No. VA0063177***

Dear Mr. Brooks,

As required by the Virginia Pollution Discharge Elimination System permit issued to the City of Richmond Department of Public Utilities in October 2018, the City submits its Integrated Annual Report for both the Combined Sewer System and the Municipal Separate Storm Sewer System for the permit period January 1, 2023, through December 31, 2023.

The city appreciates the opportunity to continue to report on our activities under the first ever integrated permit in the Commonwealth of Virginia.

Please contact me if any further information is required. Thank you.

Sincerely,

*April Bingham*

April Bingham, MPA  
Director

Cc: Joy Abel - DEQ  
Jefferson Reynolds – DEQ  
Jaime Lynn Bauer Robb - DEQ  
Grace LeRose - DPU  
Robert Stone – DPU  
Eric Whitehurst - DPU

City of Richmond, Virginia  
Department of Public Utilities  
Integrated CSS and MS4  
2023 Annual Report

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March 31, 2024



Legend for Cover Photos:

1. CSS Public Stakeholder Group Members touring Gillies Creek CSO Outfalls – August 2023
2. Construction Progress Photo for the Outfall 004 Interim Plan Project – August 2023
3. Pine Camp Safety Project and Stream Rehabilitation – Photo from Mark Lewis

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## List of Abbreviations

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BMP	best management process
City	City of Richmond
CSS	combined sewer system
DPU	Department of Public Utilities
DWF	dry weather flow
DWO	dry weather overflow
I/I	inflow and infiltration
MG	million gallons
MGD	million gallons per dayA
MS4	Municipal Separate Storm Sewer System
NMC	nine minimum controls
SCM	six minimum controls
WWTP	Richmond Wastewater Treatment Plant

## Section 1

# General Information

### Permittee Name

City of Richmond (City)

### System Name

City of Richmond, Department of Public Utilities (DPU)

Richmond Wastewater Treatment Plant (WWTP), Richmond Combined Sewer System (CSS) and Richmond Municipal Separate Storm Sewer System (MS4)

### VPDES Permit No.

VA0063177

### Reporting Period

January 1, 2023 through December 31, 2023

### 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."

*April Bingham*

March 29, 2024

April Bingham, Director of the Department of Public Utilities

Date



## Section 2

# Combined Sewer System (CSS)

The metered results of the volume and number of overflows for each combined sewer overflow (CSO) outfall based on the measured storm event data for the 2023 reporting period is presented in Tables 2-1 and 2-2 below, respectively. A map of the CSS outfalls is presented in Appendix A.

**Table 2-1. Metered Overflow Volume (MG)**

CSO Outfall	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	Sep 2023	Oct 2023	Nov 2023	Dec 2023	Total FY23
<b>Hampton Street CSO Area</b>													
19	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>McCloy Street CSO Area</b>													
20	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Northside James River Park CSO Area</b>													
7	0	0	0	0	0.4	0	0.2	0	0.2	0	0	0.1	0.9
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0.1	0	0	1.1	1.9	0.8	1.5	0.8	2.3	0.0	0.4	4.2	13.1
<b>Southside James River Park CSO Area</b>													
15	0	0	0	0.1	5.4	0.6	5.9	0.2	3.2	0	0.3	4.6	20.3
16	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0.0	1.6	0	0.2	0	1.5	0	0	0.7	4.0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
40	1.2	0.5	0.0	3.9	13.3	3.7	12.0	0.4	0.0	0.2	2.0	24.0	61.2
<b>Shockoe Creek CSO Area</b>													
6	2.4	21.7	0	145.3	172.0	57.0	95.0	46.0	232.0	0	81.0	584.0	1436.4
34	0.1	0	0	0	2.4	2.3	3.3	0.4	2.0	0.1	0.1	1.8	12.5
<b>Wastewater Treatment Plant CSO Area</b>													
14	0	0	0	0.5	6.1	0.8	3.9	0.2	4.1	0	0.3	3.6	19.5
21	0.3	0	0	4.6	10.8	1.0	1.5	1.2	19.0	0	6.2	59.0	103.6
<b>Gillies Creek CSO Area</b>													
4	0.4	0.1	0	0.9	3.3	1.8	3.1	0.2	3.1	0	0.4	1.6	14.9
5	0	0	0	3.4	6.8	0.8	1.6	0.8	5.7	0	3.2	44.0	66.3
24	0	0	0	0	0.1	0	1.6	0	0	0	0	0.2	1.9
25	0	0	0	0	0.2	0.1	1.0	0	0	0	0	0.1	1.4
26	0	0	0	0	1.0	0.1	1.9	0	0.1	0.1	0	0.2	3.4
31	0	0	0	0	3.3	3.6	5.5	0.6	2.3	0	0	6.3	6
35	0.1	0	0	0.2	0.3	0.2	0.3	0.1	0.4	0	0.1	0.8	5
39	0.3	0	0	0.6	2.4	0.5	2.1	0.1	3.1	0	0.4	2.8	12.3
<b>Hilton Street CSO Area</b>													
12	0	0	0	0	0.2	0	1.0	0	0.1	0	0	0.1	1.4

Table 2-2. Metered Number of Overflow Occurrences													
CSO Outfall	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	Sep 2023	Oct 2023	Nov 2023	Dec 2023	Total FY23
<b>Hampton Street CSO Area</b>													
19	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>McCloy Street CSO Area</b>													
20	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Northside James River Park CSO Area</b>													
7	0	0	0	0	1	1	3	1	1	0	0	1	8
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	3	1	0	3	2	3	3	3	2	0	1	4	25
<b>Southside James River Park CSO Area</b>													
15	1	0	0	1	1	1	3	1	2	1	1	4	16
16	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	1	0	1	0	1	0	0	2	5
18	0	0	0	0	0	0	0	0	0	0	0	0	0
40	5	3	1	4	3	1	3	1	0	1	1	4	27
<b>Shockoe Creek CSO Area</b>													
6	2	2	0	4	3	1	3	1	2	0	1	3	22
34	1	1	0	1	2	1	3	1	3	1	1	4	19
<b>Wastewater Treatment Plant CSO Area</b>													
14	0	0	0	1	1	2	3	1	2	0	1	3	14
21	2	0	0	1	1	1	1	1	1	0	1	3	12
<b>Gillies Creek CSO Area</b>													
4	5	3	0	3	2	1	3	1	3	1	1	4	27
5	0	0	0	1	1	1	3	1	1	0	1	3	12
24	0	0	0	0	1	0	3	0	2	0	0	1	7
25	0	0	0	0	1	1	2	0	0	0	0	1	5
26	0	0	0	0	1	1	3	0	1	1	0	2	9
31	0	0	0	0	1	1	3	1	2	0	1	3	12
35	5	1	0	2	2	1	3	1	3	1	1	4	24
39	5	0	2	1	2	1	3	1	2	0	1	3	21
<b>Hilton Street CSO Area</b>													
12	1	0	1	0	1	0	3	0	1	0	0	2	9

### Section 3

# CSS and MS4 Nine Minimum Controls (NMC) and Six Minimum Controls (MCM)

## 3.1 Operation and Maintenance of the CSS (NMC 1)

### 3.1.1 Inspection and Maintenance of CSS Control Structures and Pump Stations

The City follows a regular schedule for inspection and maintenance of regulators, CSO outfalls, and pump stations. The schedule of performance of the City’s O&M program is summarized in Table 3-1 and 3-2 below. Equipment inspection, screen cleaning and debris removal are part of the regular activities.

Table 3-1. CSS Control Structure O&M Program			
CSO Control Structures	Inspection Interval	Maintenance	
		Interval	Type
Dry Weather Regulators (29) Wet Weather Regulators (10)	Monthly	Monthly	Preventative Maintenance
CSO Outfalls (25)	Monthly	Monthly	Preventative Maintenance

Table 3-2. CSS Pump Station O&M Program				
Pump Station	Capacity (MGD)		Estimated Dry Weather Peak (MGD)	Inspection/Maintenance Interval
	Firm	Installed		
Douglasdale	7.5	13.0	2.2	Daily
Hampton/McCloy	0.9	1.7	0.4	Daily
Upham Brook	8.6	13.0	0.3	Daily

If major repairs are deemed necessary at the inspection, a work order is initiated, and the repairs are scheduled.

### 3.1.2 Sewer Flushing and Cleaning

The City follows a regular schedule for routine sewer line flushing and cleaning. Maintenance activities performed on the collection system during the 2023 reporting period are summarized in Table 3-3 below.

Activity	Interval	Quantity
Sewer Cleaning	Annually	24.4 miles
CCTV Inspection	Annually	28.8 miles

### 3.1.3 Catch Basin Cleaning

The City follows a regular schedule for routine catch basin cleaning. The City cleaned 3,466 catch basins throughout the CSS during the 2023 reporting period.

## 3.2 Use of Collection System for Storage (NMC 2)

### 3.2.1 Information regarding storage at Shockoe Retention Basin and Hampton/McCloy Tunnel

Storage is provided in the Shockoe and Hampton/McCloy CSO areas through existing retention facilities.

- The Shockoe facilities serve about 8,000 acres of the CSS and comprise a 35 million gallon (MG) retention basin with upstream in-line storage of approximately 15 MG in diversion structures and arch and box sewers.
- The Hampton/McCloy tunnel serves about 1,012 acres of the CSS and comprises a 7.2 MG retention tunnel.

### 3.2.2 Sewer Re-lining Activities to reduce Inflow and Infiltration (I/I)

The City implements a sewer lining program annually to reduce I/I. The City lined 3.0 miles of sewer during the 2023 reporting period.

### 3.2.3 Operation of WWTP influent pumping to fill intercepting system

During wet weather events the Main Pumping Station is operated at 140 MGD to maximize flow to the WWTP. The Main Pumping Station is operated ahead of anticipated wet weather events to the lower the hydraulic gradeline in the collection system to create additional storage capacity in the interceptor system. As the wet weather event begins, the Main Pumping Station’s flowrate is increased to 140 MGD at a lower elevation to maximize flow through the WWTP, before the interceptor inline storage is utilized. As the wet weather event continues, combined sewage is stored in the interceptor system before overflows occur.

Portions of the intercepting sewers that convey flow to the WWTP are located at elevations below the lowest CSO outfall overflow elevation. The majority of these low-lying intercepting sewers are in the Shockoe CSO drainage area where the lowest overflow elevation is 1.00 feet. Table 3-4 below summarizes the intercepting sewers below the lowest CSO overflow elevation and the corresponding estimated storage capacity.

Intercepting Sewer	Diameter (inches)	Length Below (El + 1.00 (feet)	Storage Capacity (MG)
Lower Goodes Creek	72	10,905	2.61
Twin River Crossings	66	1,100	0.39
Hull Street	60	2,700	0.40
Shockoe	96	2,700	1.02
Gillies Creek	60	2,500	0.37
Northside CSO Conveyance (1)	96, 84, 60	2,850	0.89
<b>Total</b>			<b>5.68</b>
(1) Northside CSO Conveyance stores CSS to an elevation of 16.0 feet			

### 3.2.4 Tide Gate Inspections

The City routinely inspects and makes necessary repairs to tide gates to reduce tidal intrusion into the collection system. The City follows a regular schedule for inspection and maintenance of tide gates. The schedule of performance of the City’s O&M program is summarized in Table 3-5 below. Equipment inspection, and debris removal are part of the regular activities.

Gates	Inspection Interval	Maintenance	
		Interval	Type
CSO 04 (Bloody Run) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 05 (Peach Street) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 06 (Shockoe) Tide Gates (6)	Monthly	Monthly	Preventative Maintenance
CSO 14 (Stockton Street) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 15 (Canoe Run) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 16 (Woodland Heights) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 17 (Reedy Creek) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 18 (42 <sup>nd</sup> Street) Tide Gate	Monthly	Monthly	Preventative Maintenance
CSO 19 (Hampton) Flap Gate (2)	Monthly	Monthly	Preventative Maintenance
CSO 20 (McCloy) Flap Gate (3)	Monthly	Monthly	Preventative Maintenance
CSO 21 (Gordon Avenue) Tide Gate	Monthly	Monthly	Preventative / Corrective Maintenance

### 3.2.5 Use of Public and Private Stormwater Facilities in the CSS Area

Local retention facilities provide additional stormwater storage in the CSS area. Examples of these types of facilities are shown in Table 3-6 below.

<b>Table 3-6. Local Stormwater Retention Facilities in the CSS Area</b>		
<b>Site</b>	<b>Location</b>	<b>Owner</b>
Brander St. Pump Station Holding Pond	Brander St.	City
Gordon Ave. Pump Station Holding Pond	Gordon Ave.	City
DPU Operations Parking Lot	Commerce Rd.	City
Sonoco Products Company	Commerce Rd.	Private (1)
BP Products North America	Commerce Rd.	Private (1)
Citgo Petroleum Corporation	Maury St.	Private (1)
First Energy Corporation	Maury St.	Private (1)
Magellan Terminals Holdings, L.P. Richmond Terminal	East First St.	Private (1)
Transmontaigne Terminaling	Commerce Rd.	Private (1)
(1) Industry that retains stormwater on-site during wet weather events and control releases to permit limits at the WWTP		

### 3.2.6 Use of Real Time Decision Support System to manage flows during CSO Events

The City of Richmond DPU utilizes 99 depth sensors, 55 flow meters, and 13 rain gauges (shown below in Figure 3-2) to monitor the collection system.

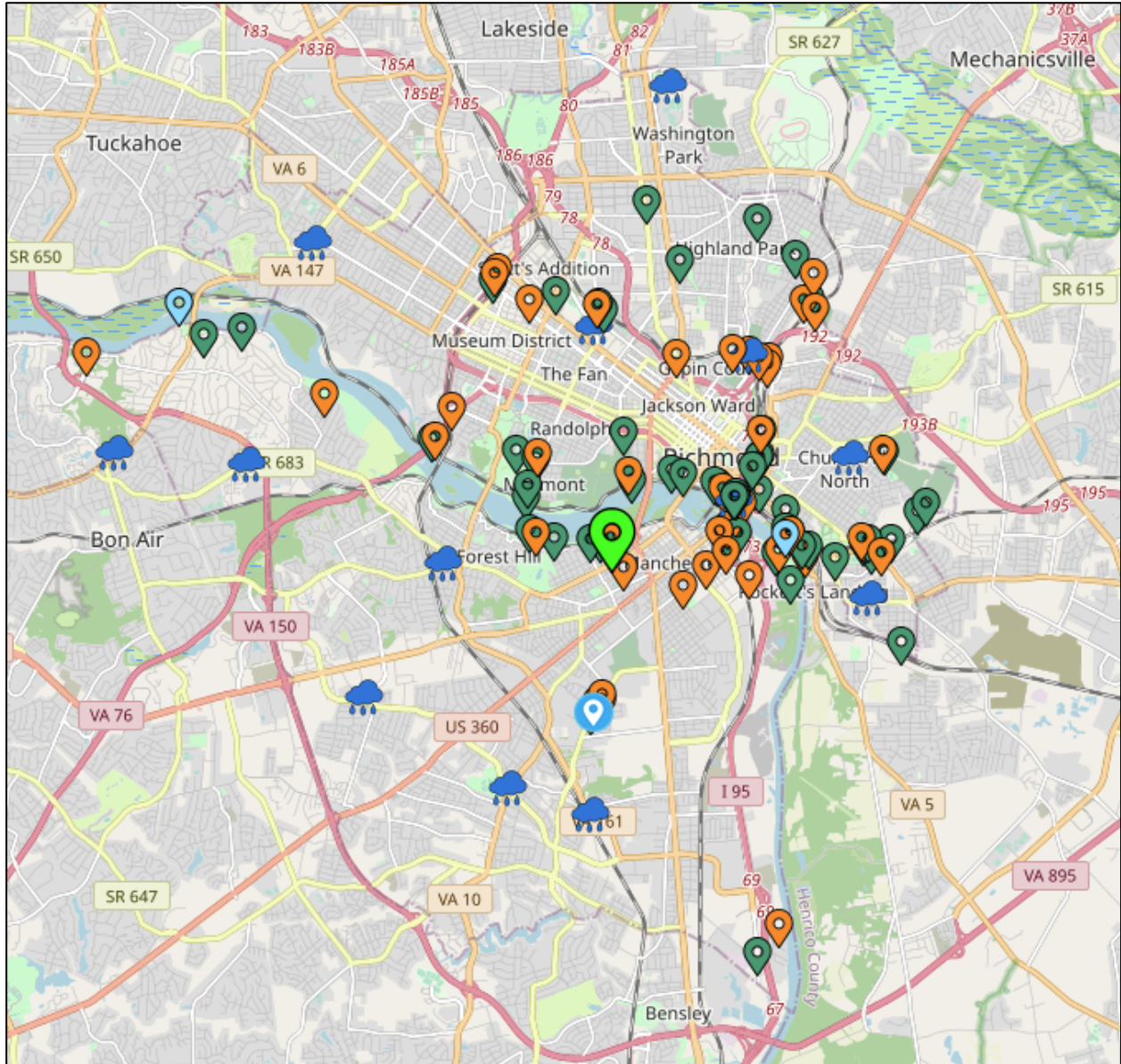


Figure 3-1: Collection System Monitoring System

The data can be displayed in real time, as shown below in Figure 3-3.

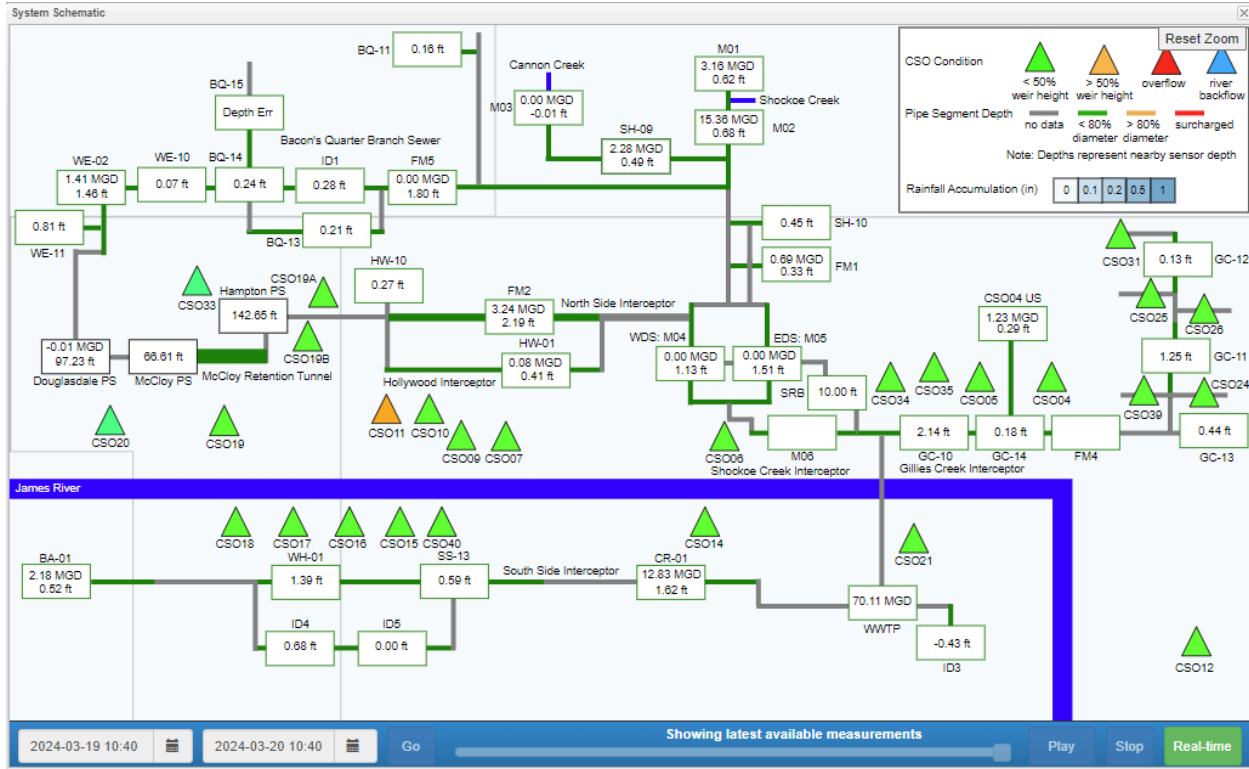


Figure 3-2: Real Time Collection System Data Display

The collected data is also utilized in the *Richmond CSO Map Notification*, which is available to the public, that displays outfalls that are currently overflowing or have overflowed in the past 48 hours.

<https://apps.emnet.net/richmond-pub-map-app/?city=47&config=5c0cacee-7e95-4eea-922d-c736c83eb4b9>

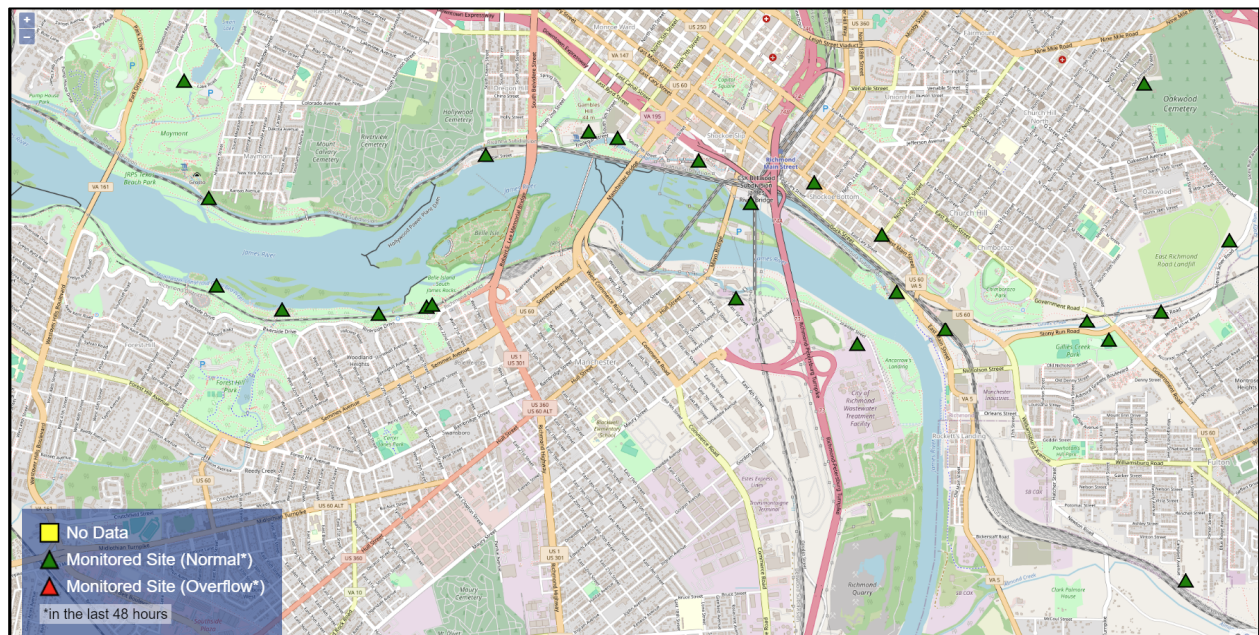


Figure 3-3: Richmond CSO Notification Map



### 3.3 Review of Pretreatment Program (NMC 3)

#### 3.3.1 Changes or Use of Pretreatment Program Authority to minimize flows during CSO Events

The City administers an industrial pretreatment program as required by the VPDES permit. Industries discharging to the CSS retain stormwater on-site during wet weather events and control releases to permit limits at the WWTP. Information on individual industries which utilize retention facilities is summarized in Section 3.2.5 – Use of Public and Private Stormwater Facilities in the CSS Area. Each industry is issued an Industrial User Permit which includes a section on Discharge of Stormwater. The below statement was added to the Industrial User Permits:

E. Storm water runoff collected within the containment dike structure shall be released to the City's Treatment System in accordance with the following criteria:

1. There shall be no discharge of floating solids, visible foam or oily sheen in other than trace amounts; and
2. During storm events where the accumulation of rainfall is in excess of 2.2 inches; the permittee will use the installed precipitation gauge system to determine the volume of rainfall at the terminal; which would then trigger the terminal to call the City of Richmond's Department of Public Utilities Publicly Owned Treatment Works (POTW) at (804) 646-8721 to inform them of the level of rainwater retained in the diked area. It is at this time that the POTW will advise whether the plant is able to handle the facility's effluent. Nevertheless, neither the facility's nor the POTW's welfare will be jeopardized.
3. The Terminal Manager shall contact the City's Environmental Compliance Officer on 804.646.8661 and notify him/her of the intent to discharge, at least 24 hours prior to initiating any discharge other than in 2 above.

During this reporting period, there have been no additional changes to the program to minimize flow during a CSO event.

### 3.4 Maximize Flow to the WWTP for Treatment (NMC 4)

#### 3.4.1 Operation of WWTP during Precipitation events to show Maximization of Treatment of Wet Weather Flows

The City maximizes flow to the WWTP during wet weather events by performing the following actions:

- Influent flow at the WWTP is increased to 140 MGD in wet weather conditions based on the newly developed SOP (see Figure 3-5).
- Flows up to 140 MGD are treated at the WWTP to permit limits.
  - 75 MGD receives full treatment and disinfection (Primary, Secondary, Tertiary and UV Disinfection)
  - 65 MGD receives primary treatment and UV disinfection (Primary and UV Disinfection)
- Combined sewage is stored in the Shockoe Retention Basin (see Figure 3-5), Hampton/McCloy Tunnel (see Figure 3-6) and the collection system prior to overflow.
- The Shockoe Retention Basin and Hampton/McCloy tunnel are drained as soon as possible once overflow conditions are concluded. During the draining process the WWTP continues to operate at 75 MGD.

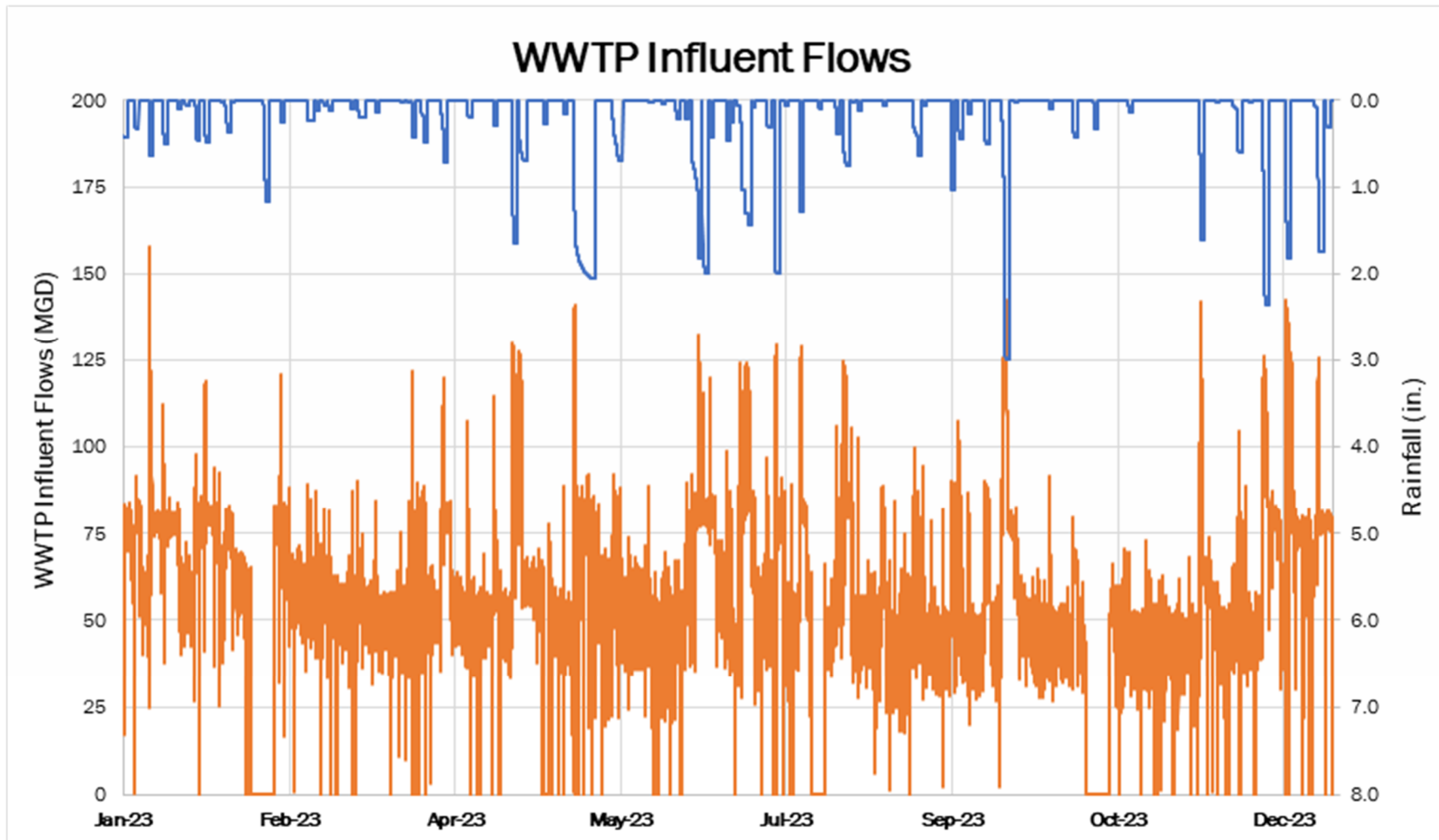


Figure 3-4: WWTP Influent Flows

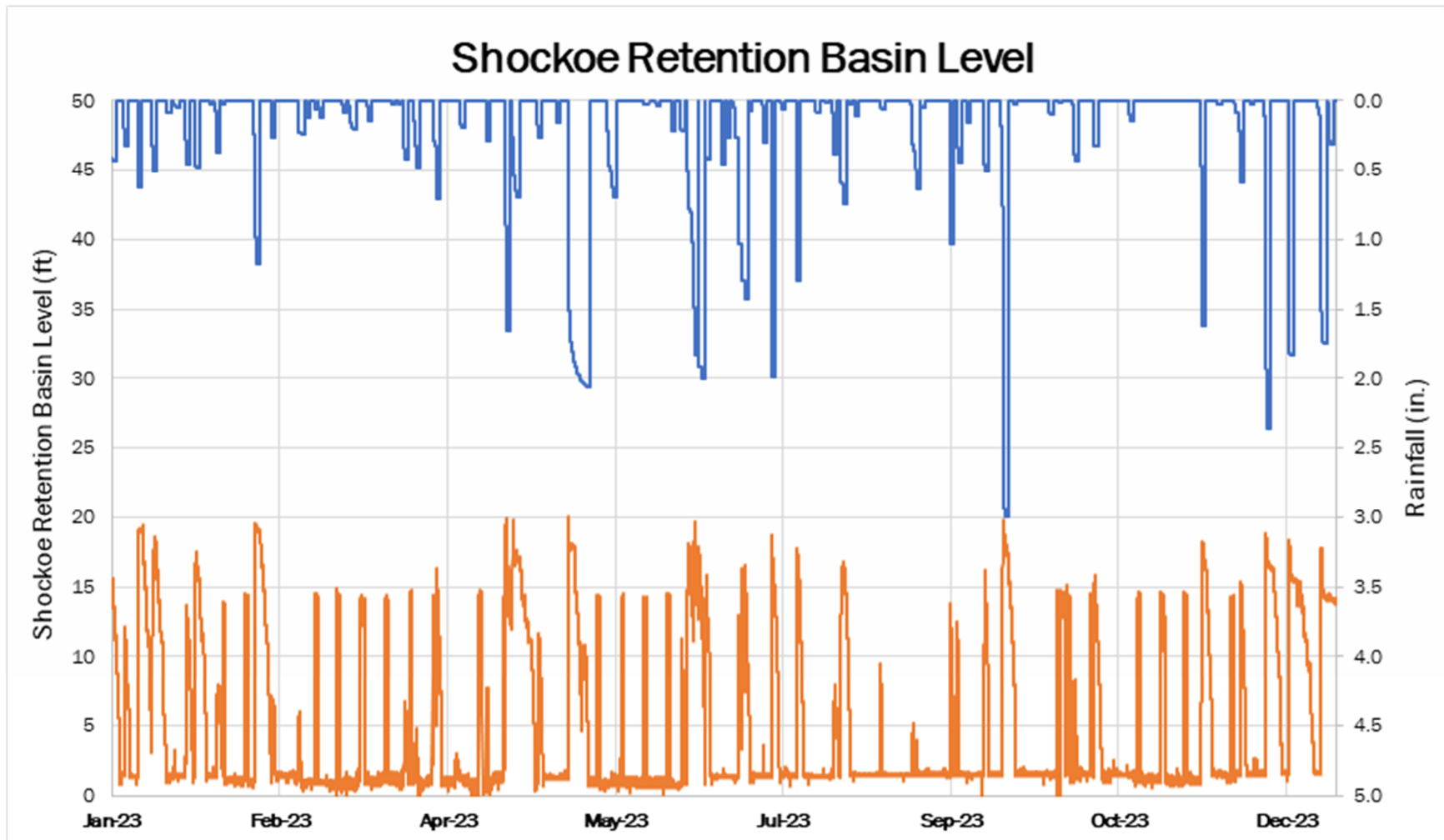


Figure 3-5: Shockoe Retention Basin Levels

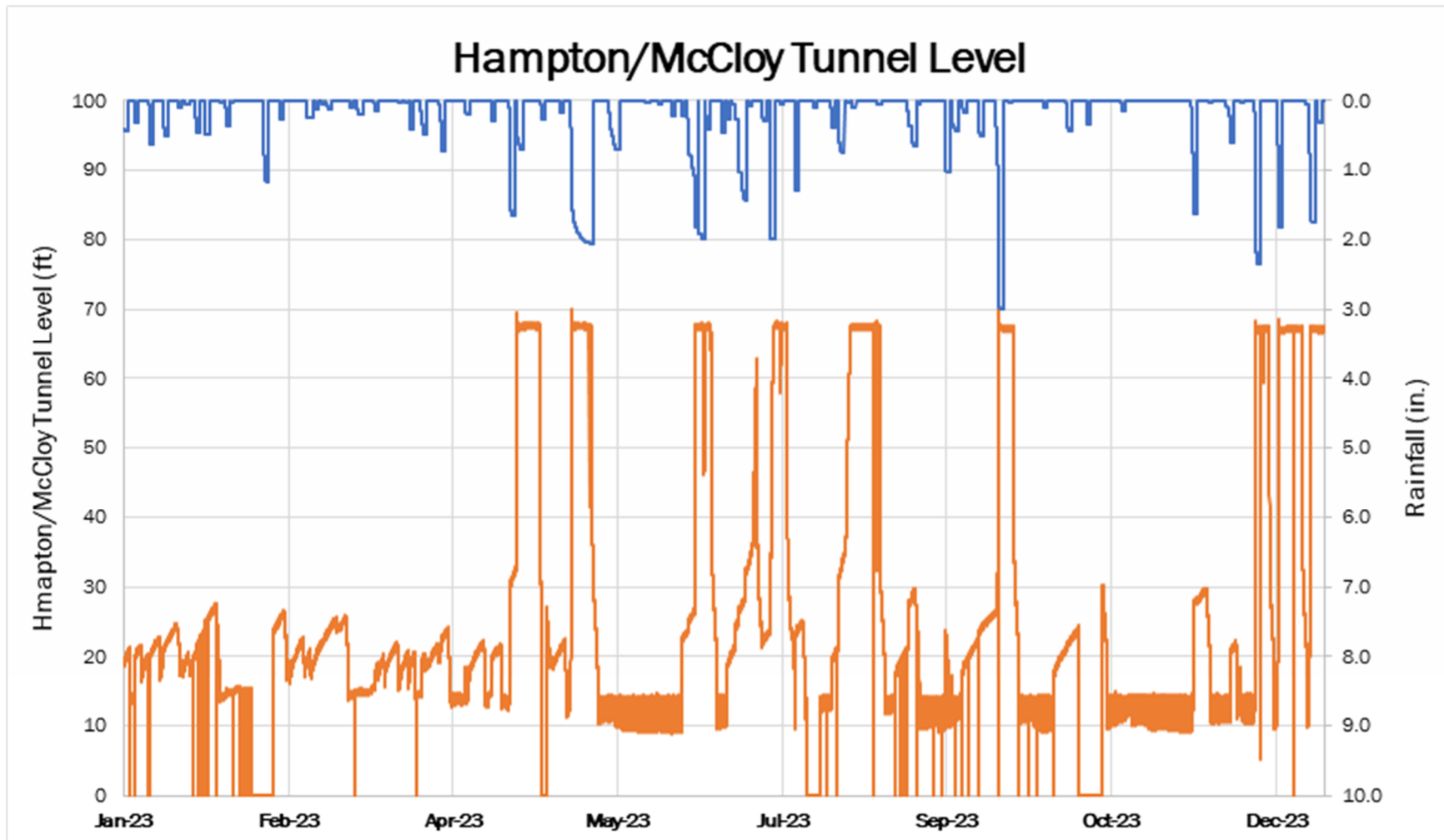


Figure 3-6: Hampton/McCloy Tunnel Levels

### 3.5 Eliminate Dry Weather Overflows (DWOs) (NMC 5)

#### 3.5.1 Inspection and Maintenance of Diversion Facilities

The City regularly inspects and maintains CSS diversion facilities to prevent dry weather overflows, see Section 3.1.1. If a dry weather discharges occurs, the City maintains an “on call” team of maintenance personnel to respond to blockages or other occurrences that could result in dry weather discharges.

#### 3.5.2 Monitoring of Pumping Stations for DWOs

The City inspects and maintains the pump stations on a daily basis to prevent dry weather overflows, see Section 3.1.1. If a dry weather discharges occurs, the City maintains an “on call” team of maintenance personnel to respond to blockages or other occurrences that could result in dry weather discharges.

#### 3.5.3 Operation of the Shockoe Retention Basin

The Shockoe retention basin is continuously staffed. The basin is utilized to store combined sewage during wet weather conditions and is drained as soon as possible after overflow conditions have concluded. The 2023 operating levels of the Shockoe Retention Basin are shown in Section 3.4.1.

#### 3.5.4 Reports of DWOs

All dry weather overflows are reported in accordance with the VPDES permit. Table 3-7 below summarizes each dry weather overflow event that occurred and were resolved during the reporting period.

Date of Incident	Location of Incident	Volume Discharged (gallons)	Event Description
3/7/23	N 31st St and E Franklin St	33,000	The discharge occurred just south of the Intersection of N 31st St & E Franklin St. The manhole discharged into a wooded ravine containing the discharge within the area.  Emergency by-pass pumping was put in place to alleviate the surcharge until construction corrected the issue.
3/21/23	6200 River Road	360	8” Sewer pipe was blocked with grease
3/27/23	326 Lynton Lane	180	8” Sewer pipe was blocked with solids and debris
12/27/23	1400 Brander Street	508	The discharge piping at the Wastewater Treatment Plant Supplemental Pumping Station, developed four small holes in the ductile iron piping.

### 3.6 Control Solid and Floatable Materials in the CSS (NMC 6)

#### 3.6.1 Cleaning and Maintenance related to Control of Solid and Floatable Materials

The City implements many programs and strategies to capture and remove solid and floatable material from CSS areas. Table 3-8 below summarizes the city-wide programs conducted during the reporting period.



<b>Program</b>	<b>Quantity</b>
Loose-Leaf Collection	8,362 tons removed
Litter Basket Collection	270 tons removed
Catch Basin Cleaning	3,466 basins cleaned
Street Sweeping	6,737 tons removed

Additional strategies the City implements to control solid and floatable material in CSS areas include:

- The Shockoe retention facilities provide continuous mechanical screening for over two-thirds of the CSS. Screening operations at the facilities are increased during leaf season.
  - The Shockoe Diversion Structure Trash Rake Replacement project (*in construction*) will replace the screening system at the Shockoe West Diversion Structure to increase the volume of the screenings removed from the facility.
- The Hampton/McCloy tunnel provides continuous mechanical screening. All flow captured in the tunnel is screened prior to transfer to the WWTP, which consist of 1,012 acres of the CSS. The tunnel is equipped with solid and floatable capture chambers.
- The Northside, Southside James River Park, Gillies Creek, and Hilton Street CSO conveyance facilities have flotation or stilling chambers and/or static screens along with baffles to capture solid and floatable material. The material captured is transferred to the intercepting sewers for removal at the WWTP.

### 3.7 Public Education and Outreach (MCM 1, NMC 7 and NMC 8)

#### 3.7.1 List of High-Priority Stormwater Issues and Strategies

The City identified three high-priority stormwater issues to be addressed in their public education and outreach program.

##### 3.7.1.1 High Priority Issue #1: Pet Waste

- Rationale for Selection: Minimize the degree of pet waste runoff to reduce the bacteria loads entering local waterways
- Identification of Public Audience: Pet Owners
- Strategies
  - Traditional written materials: Fact Sheets; flyers; handouts
  - Alternative materials: Pet waste stations; pet waste bags and holders
  - Signage: Yard Signs
  - Media materials: Radio ads; social media posts
  - Speaking engagements: Presentations to varied community groups

The specific events/media utilized to address public education on Pet Waste are summarized below in Table 3-9.

Table 3-9. Strategies to Communicate High Priority Issue #1 – Pet Waste	
Programming	Strategy Type
Distributed Pet Waste Handouts and Pet Waste Yard Signs to Private Citizens and Community Organizations at “Pet Waste Yard Sign Pick-Up Event” on 3/10/23	Traditional Written Materials and Signage
Distributed 112,500 Pet Waste Bags to Richmond Animal Care and Control on 8/23/23	Alternative Materials
Distributed Pet Waste Bags and Holders to the Department of Parks, Recreation, and Community Facilities, “Friends of” Park Groups, and Private Citizens Year-Round	Alternative Materials
Distributed Pet Waste Yard Signs to Private Citizens, Community Organizations, and “Friends of” Park Groups Year-Round	Signage
Utilized X (formerly Twitter), Instagram, and Facebook to Share Information Related to the Importance of Picking Up Pet Waste via Social Media Posts Year-Round	Media Materials
Distributed Pet Waste Stations to the Department of Parks, Recreation, and Community Facilities and “Friends of” Park Groups, including Trash Cans	Alternative Materials

**RVA H2O** RVAH2O  
@rvah2o

clean water and sidewalks free of dog poo are things we can all agree on.  
so...who needs a yard sign?

[#RichmondVA](#) [#RVA](#) [#RichmondVirginia](#)



**RVA Coffee Stain** @RVACoffeeStain · May 30, 2019  
Richmonders love a good independently designed yard sign about a local controversy.

2:22 PM · Mar 7, 2023 · 3,016 Views

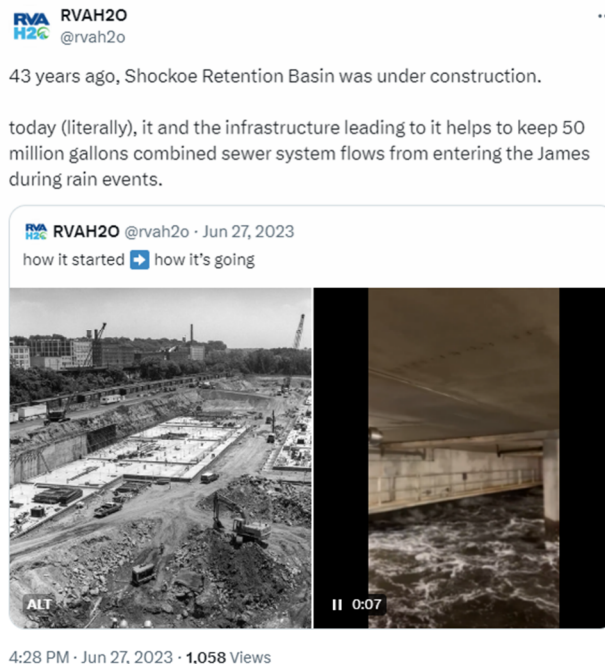
Figure 3-7: Pet Waste Post on X on 3/7/2023

**3.7.1.2 High Priority Issue #2: General Stormwater Awareness**

- Rationale for Selection: Educate residents on stormwater and its impact on the environment to improve the quality and minimize the quantity of urban runoff from residential areas
- Identification of Public Audience: Richmond citizens and school-age students
- Strategies
  - Traditional written materials: Newsletters
  - Signage
  - Media materials: webpage, social media posts
  - Speaking engagements: Presentations to varied community groups

The specific events/media utilized to address public education on General Stormwater Awareness are summarized below in Table 3-10.

Table 3-10. Strategies to Communicate High Priority Issue #2 – General Stormwater Awareness	
Programming	Strategy Type
Department of Public Utilities’ Citizens Academy - Combined Sewer System Regulatory Requirements, Pretreatment Presentation, and Wastewater Treatment Plant Tour 5/16/23	Speaking Engagement
Department of Public Utilities’ Citizens Academy - Combined Sewer System Regulatory Requirements, Pretreatment Presentation, and Wastewater Treatment Plant Tour on 10/17/23	Speaking Engagement
Shared General Stormwater Information at Various Community Presentations, Formal and Informal, Year-Round, Including During the Introductions for the Greening Richmond Public Libraries Planting Events with the James River Association on 4/22/23, 9/29/23, and 11/14/23	Speaking Engagements
RVAH2O.org Website as a Resource to House Project Information and Stormwater Basics, and Share Best Practices, which Received 6,200 Distinct Visitors to the Webpage 8,658 Distinct Times during 2023	Media Materials



**Figure 3-8: Shockoe Retention Basin Posts on Social Media “X” from 6/27/2023 sharing general information about stormwater in Richmond’s combined sewer system**



**3.7.1.3 High Priority Issue #3: Litter Awareness**

- Rationale for Selection: Minimize the degree of litter entering the storm sewer system and local waterways to achieve higher water quality
- Identification of Public Audience: Pedestrians
- Strategies
  - Alternative materials: Stickers
  - Media materials: Radio ads; social media posts
  - Speaking engagements: Presentations to varied community groups

The specific events/media utilized to address public education on Litter Awareness are summarized below in Table 3-11.

<b>Table 3-11. Strategies to Communicate High Priority Issue #3 – Litter Awareness</b>	
<b>Programming</b>	<b>Strategy Type</b>
Utilized X (formerly Twitter) to Share Information Related to the Importance of Keeping Richmond Litter-Free on Social Media	Media Materials
Distributed Don't Trash Central Virginia Stickers at Events and in Goodie Bags Year-Round	Alternative Materials
Utilized Social Media to Share Information for Followers to Get Involved in Litter Clean Ups with Community Partners	Media Materials

Hey @rvah2o what's this truck do???



3:42 PM · Jul 16, 2023 · 497 Views

3 replies · 8 likes · 1 retweet

**RVAH2O** @rvah2o · Jul 16, 2023  
longer answer: this vector truck (lovingly called a vac truck) is a tool that helps these fantastic crew members clear debris and clean inlets and other infrastructure (including some of the floodwall's tracks!). truly one of our favorite pieces of equipment.

1/

4 replies · 1 retweet · 6 likes · 380 views

**RVAH2O** @rvah2o · Jul 16, 2023  
now, for how it works: the white tube/bendy black piping you can see across the top and front of the truck sucks up debris. but sometimes, things are a little stuck and caked in place, so we use the orange hose at the front to loosen things before vacuuming them up.

2/

1 reply · 1 retweet · 1 like · 48 views

**RVAH2O** @rvah2o · Jul 16, 2023  
as a comparison (if you're good about going to the dentist): the orange hose is just like that mini pressure washer situation they use to rinse off your teeth, and the white tube and black piping is the suction they use to soak up all the water and spit :)

3/

1 reply · 2 likes · 67 views

**RVAH2O** @rvah2o · Jul 16, 2023  
in our case, our vac trucks are often sucking up leaves (peeps, please don't put them in your ditch or local storm drain), trash (peeps, please don't litter), and silt, sand, and dirt that find their way into stormwater runoff.  
our vac trucks really are fantastic tools. ❤️

4/4

1 reply · 1 retweet · 1 like · 66 views

**RVAH2O** @rvah2o · Jul 16, 2023  
bonus tweet! here's a quick clip from a neat vantage point of two of our vac trucks in action (mainly just doing the suction part) last month as we cleaned and maintained the floodwall closure at the southern end of the Mayo Bridge.

5/5



1 reply · 2 likes · 90 views

**RVAH2O** @rvah2o · Jul 16, 2023  
video description: this 16-second clip shows eight people wearing high visibility clothing, long pants, and hard hats using vector trucks to clean the tracks of the southern Mayo Bridge floodwall closure in Richmond, Virginia. the videographer filmed from on top of the floodwall.

1 reply · 1 retweet · 1 like · 71 views

**Figure 3-9: Posts and Conversation on Social Media “X” Sharing Information about Stormwater Utility’s Vector Trucks, Their Role, and the Importance of Eliminating Litter Before it Reaches Richmond’s Stormwater System**

### 3.7.2 Proper Disposal of Substances - Public Education Programs and Facility Tours

The educational programs and tours conducted and/or hosted by the City during the reporting period to educated on the proper disposal of substances are summarized in Table 3-12 below.

Date	Program/Tour
1/14/2023	Household Hazardous Waste Take-Back Event
5/13/2023	Household Hazardous Waste Take-Back Event
5/16/2023	Department of Public Utilities’ Citizens Academy - Combined Sewer System Regulatory Requirements, Pretreatment Presentation, and Wastewater Treatment Plant Tour

Table 3-12. Public Education Programs and Facility Tours	
Date	Program/Tour
9/30/2023	Household Hazardous Waste Take-Back Event
10/17/2023	Department of Public Utilities' Citizens Academy - Combined Sewer System Regulatory Requirements, Pretreatment Presentation, and Wastewater Treatment Plant Tour

### 3.7.3 Pretreatment Awareness Programs

The pretreatment awareness programs that were implemented to encourage industrial waste reduction through recycling and improved housekeeping are summarized in Table 3-13 below.

Table 3-13. Awareness Programs to Encourage Waste Reduction	
Date	Event
1/14/2023	Household Hazardous Waste Take-Back Event
5/13/2023	Household Hazardous Waste Take-Back Event
9/30/2023	Household Hazardous Waste Take-Back Event

## 3.8 Public Involvement and Participation (MCM 2 and NMC 8)

### 3.8.1 Public Input on MS4 Program

Stormwater complaints received by the City, and complaints that were addressed and closed out through the duration of the reporting period are summarized in Table 3-14 below.

Table 3-14. Stormwater Complaints Summary (Cityworks)	
No. of Complaints Received	1,365
No. of Complaints Closed	1,234

### 3.8.2 Published Information on a City-Controlled website pertaining to the CSO Control and MS4 Program

Published information on the CSO control and MS4 programs is located at the following City-controlled websites:

<https://www.rva.gov/index.php/public-utilities/wastewater-utility>

<https://www.rva.gov/index.php/public-utilities/pretreatment>

<https://www.rva.gov/public-utilities/stormwater-management>

<https://www.rva.gov/public-utilities/stormwater-utility>

<https://www.rva.gov/public-utilities>



### 3.8.3 Public Involvement Activities

The public involvement activities conducted and/or hosted by the City during the reporting period are summarized in Table 3-15 below.

Table 3-15. Public Involvement Activities	
Date	Event
1/14/2023	Household Hazardous Waste Take-Back Event
2/2/2023	Wastewater Treatment Plant and Shockoe Retention Basin Tour with VPM
2/13/2023	Wastewater Treatment Plant Tour with Triple Crossing Brewing
5/13/2023	Household Hazardous Waste Take-Back Event
5/16/2023	Citizens Academy - Combined Sewer System Regulatory Requirements, Pretreatment, and Wastewater Treatment Plant Tour
5/23/2023	Citizens Academy - Shockoe Retention Basin Tour
8/7/2023	Camp DPU
9/30/2023	Household Hazardous Waste Take-Back Event
10/16/2023	Wastewater Treatment Plant Tour with DEQ
10/17/2023	Citizens Academy - Combined Sewer System Regulatory Requirements, Pretreatment, and Wastewater Treatment Plant Tour
10/24/2023	Citizens Academy - Shockoe Retention Basin Tour

### 3.8.4 Public Involvement Metric Evaluation

The metrics used to evaluate the effectiveness of the implemented public involvement activities are summarized in Table 3-16 below.

Table 3-16. Public Involvement Activities			
Public Involvement Opportunity Outlined in Program Plan	Metric as Defined in Program Plan	Metric Measurements	Evaluation
Monitoring - Volunteer Monitoring	The number of participants per training event	No volunteer samples were conducted during the 2023 reporting year.	Volunteer sampling was suspended to comply with COVID-19 protocols.
Watershed Restoration Events	The number of participants per event	4/22/23 East End Branch Greening Richmond Public Libraries Tree Planting - 11 volunteers	In 2023, the Department of Public Utilities partnered with the James River Association and Richmond Public Libraries on multiple occasions to bring green infrastructure, including native plantings and additional tree canopy to intercept stormwater and fill bioretention basins, to Richmond’s public libraries and their adjacent neighborhoods.  On 4/22/23, 12 volunteers planted 8 native street trees, including Sweetbay Magnolias, on North 24th Street, near the East End Branch Richmond Public Library, and at the East End

Table 3-16. Public Involvement Activities			
Public Involvement Opportunity Outlined in Program Plan	Metric as Defined in Program Plan	Metric Measurements	Evaluation
		<p>9/29/23 East End Branch Greening Richmond Public Libraries Initiative - 30 volunteers</p> <p>11/14/23 North Avenue Branch Greening Richmond Public Libraries Tree Planting - 80 volunteers</p>	<p>Branch Richmond Public Library in Richmond's 7th City Council District</p> <p>On 9/29/23, 30 volunteers planted the bioretention basins at the East End Branch Richmond Public Library following the construction of green infrastructure best management practices as part of the Greening Richmond Public Libraries Initiative. Over the course of two days, 9/29/23 and 9/30/23, volunteers planted 312 native plants at the East End Branch Richmond Public Library in Richmond's 7th City Council District.</p> <p>On 11/14/23, 80 volunteers planted 31 native trees, including River Birches, White Fringetrees, Eastern Redbuds, Sweetbay Magnolias, and White Oaks, along Barton Avenue and East and West Essex Street, near the North Avenue Branch Richmond Public Library, in Richmond's 3rd City Council District</p>
Disposal or Collection Event - Household Hazardous Waste Collection Events	The number of barrels of hazardous waste collected	<p>1/14/23</p> <p>5/13/23</p> <p>9/30/23</p>	<p>26 barrels of hazardous household material were collected over the three events.</p> <p>Keeping hazardous material from being improperly disposed of and out of the environment, our stormwater, our combined stormwater and sewer infrastructure, and out of waterways is beneficial to improving and protecting water quality.</p>

### 3.8.5 Public Meetings Organized/Attended

During the reporting period, the City organized and participated in meetings with the community, regulatory agencies, stakeholders, and other MS4 permittees. These meetings are summarized in Table 3-17 below.

Table 3-17. Public Involvement Meetings	
Date	Meeting
2/22/2023	Richmond City Council Government Operations Meeting
4/27/2023	Combined Sewer System Stakeholder Group Meeting
5/30/2023	7th District Council Meeting
6/8/2023	Public Meeting - Combined Sewer Overflow Interim Plan Project
6/20/2023	Richmond City Council Government Operations Meeting
6/29/2023	Combined Sewer System Stakeholder Group Meeting



Table 3-17. Public Involvement Meetings	
Date	Meeting
7/13/2023	Public Meeting - Combined Sewer Overflow Interim Plan Project
8/24/2023	Combined Sewer System Stakeholder Group Meeting
9/28/2023	Museum District Neighborhood Meeting
10/19/2023	Combined Sewer System Stakeholder Group Meeting
11/10/2023	Chesapeake Bay Commission Meeting
12/14/2023	Combined Sewer System Stakeholder Group Meeting

### 3.8.6 CSO Warning Signs

Eighteen (18) of the twenty-five (25) CSO outfalls were predicted to discharge, more than once per summer on average. Each of these outfalls are required to have a CSO warning sign per the VPDES permit. These signs have been installed and have been maintained by DPU throughout the reporting year.



CSO Outfall Warning Signs

### 3.8.7 Local Press Coverage of CSO Program

Local press coverage of the CSS is ongoing. The articles/sessions released during the reporting period are summarized in Table 3-18 below.

Table 3-18. Local Press Coverage		
Date	Source	Link
2/22/2023	WSAZ	<a href="https://www.wsaz.com/2023/02/22/teamwork-makes-dream-work-firefighters-rescue-dog-storm-drain/">https://www.wsaz.com/2023/02/22/teamwork-makes-dream-work-firefighters-rescue-dog-storm-drain/</a>
5/5/2023	VPM	<a href="https://www.vpm.org/news/2023-05-05/james-river-sewage-pollution-richmond-city-infrastructure">https://www.vpm.org/news/2023-05-05/james-river-sewage-pollution-richmond-city-infrastructure</a>
5/8/2023	The Virginian Pilot	<a href="https://www.pilotonline.com/2023/05/08/virginia-cities-work-to-update-sewer-systems-in-advance-of-climate-change-test/">https://www.pilotonline.com/2023/05/08/virginia-cities-work-to-update-sewer-systems-in-advance-of-climate-change-test/</a>
5/12/2023	RVA Hub	<a href="https://rvahub.com/2023/05/12/timeline-and-status-fixing-richmonds-old-sewer-system-ahead-of-climate-change-factors/">https://rvahub.com/2023/05/12/timeline-and-status-fixing-richmonds-old-sewer-system-ahead-of-climate-change-factors/</a>
5/17/2023	ABC8	<a href="https://www.wric.com/news/local-news/richmond/heavy-rains-wash-raw-sewage-into-james-river-from-richmond/">https://www.wric.com/news/local-news/richmond/heavy-rains-wash-raw-sewage-into-james-river-from-richmond/</a>
5/20/2023	RVA Hub	<a href="https://rvahub.com/2023/05/30/floodwall-closing-this-weekend-for-testing-not-flooding/">https://rvahub.com/2023/05/30/floodwall-closing-this-weekend-for-testing-not-flooding/</a>
6/11/2023	Richmond Times	<a href="https://richmond.com/news/local/government-politics/james-river-gains-four-acres-of-parkland-through-richmond-acquisition/article_5d491b68-1cf6-11ee-9a1d-df797dbbe20a.html">https://richmond.com/news/local/government-politics/james-river-gains-four-acres-of-parkland-through-richmond-acquisition/article_5d491b68-1cf6-11ee-9a1d-df797dbbe20a.html</a>
7/13/2023	ABC8	<a href="https://www.wric.com/news/local-news/richmond/sewer-overflow-project-to-be-constructed-in-church-hill/">https://www.wric.com/news/local-news/richmond/sewer-overflow-project-to-be-constructed-in-church-hill/</a>
9/6/2023	Virginia Mercury	<a href="https://virginiamercury.com/2023/09/06/state-funding-for-richmond-sewer-project-stripped-out-of-budget-deal/">https://virginiamercury.com/2023/09/06/state-funding-for-richmond-sewer-project-stripped-out-of-budget-deal/</a>
9/22/2023	WTVR CBS6	<a href="https://www.youtube.com/watch?v=2u0lbaSTqXo">https://www.youtube.com/watch?v=2u0lbaSTqXo</a>
10/16/2023	Tunneling Online	<a href="https://tunnelingonline.com/tunnel-updates-october-2023/">https://tunnelingonline.com/tunnel-updates-october-2023/</a>
10/26/2023	VPM	<a href="https://www.vpm.org/news/2023-10-26/james-river-health-improves-environment">https://www.vpm.org/news/2023-10-26/james-river-health-improves-environment</a>
11/22/2023	Richmond Times	<a href="https://richmond.com/news/state-regional/government-politics/richmond-new-thoughts-about-old-sewer-pipe-could-cut-pollution-in-james/article_10bc6924-888c-11ee-a166-23880085eab9.html">https://richmond.com/news/state-regional/government-politics/richmond-new-thoughts-about-old-sewer-pipe-could-cut-pollution-in-james/article_10bc6924-888c-11ee-a166-23880085eab9.html</a>
11/27/2023	The Collegian	<a href="https://www.thecollegianur.com/article/2023/11/how-safe-is-it-to-swim-in-the-james-river">https://www.thecollegianur.com/article/2023/11/how-safe-is-it-to-swim-in-the-james-river</a>
12/10/2023	Richmond Times	<a href="https://richmond.com/opinion/column/commentary-from-polluted-to-prizewinner-virginias-largest-river-is-stagnating-again/article_60a1e040-9543-11ee-b508-abdd0652a4f7.html">https://richmond.com/opinion/column/commentary-from-polluted-to-prizewinner-virginias-largest-river-is-stagnating-again/article_60a1e040-9543-11ee-b508-abdd0652a4f7.html</a>
12/15/2023	ABC8	<a href="https://www.wric.com/news/virginia-news/youngkin-announces-50m-investment-in-richmond-sewer-overflow-control-project/">https://www.wric.com/news/virginia-news/youngkin-announces-50m-investment-in-richmond-sewer-overflow-control-project/</a>
12/18/2023	Chesapeake Bay Foundation	<a href="https://www.cbf.org/news-media/newsroom/2023/virginia/virginia-gov-youngkin-proposes-new-funding-for-water-quality-and-flood-preparedness-programs.html">https://www.cbf.org/news-media/newsroom/2023/virginia/virginia-gov-youngkin-proposes-new-funding-for-water-quality-and-flood-preparedness-programs.html</a>

### 3.8.8 Awards

The City received the following awards in 2023 for improved water quality and communication efforts:

- 2023 National Environmental Achievement Award from the National Association of Clean Water Agencies in the Operations and Environmental Performance category for the RVAH2O Green Infrastructure Master Plan



### 3.9 Illicit Discharge Detection and Elimination (MCM 3)

#### 3.9.1 MS4 Map and Information Confirmation Statement

The MS4 map and information table are up to date as of December 31<sup>st</sup> of the reporting period, and is presented in Appendix B.

#### 3.9.2 Outfall Screening Summary

The total number of outfalls screened during the reporting period as part of the dry weather screening program is summarized in Table 3-19 below. The 2023 reporting period outfall inventory records are provided in Appendix C.

Table 3-19. Outfall Screening Summary		
Creek	No. of Outfalls	IDDE Potential
Grindall Creek	64	63 Unlikely 1 Potential

#### 3.9.3 MS4 Illicit Discharges

The City investigated 10 illicit discharges during the reporting period. A summary of the illicit discharges to the MS4 is included in Appendix D.

### 3.10 Construction Site Stormwater Runoff Control (MCM 4)

#### 3.10.1 Summary of Inspections

The inspections conducted at construction sites during the reporting period are summarized in Table 3-20 below.

Table 3-20. Summary of Construction Site Stormwater Inspections		
Total Conducted	Enforcement Actions	
	Type	Total
1,785	Notice to Comply	42
	Stop Work Order	4
	Notice of Violation	1

### 3.11 Post-Construction Stormwater Management for New Development and Development on Prior Developed Lands (MCM 5)

#### 3.11.1 Summary of Inspections of Stormwater Management Facilities

The inspections conducted on privately owned and permittee owned stormwater facilities during the reporting period are summarized in Table 3-21 below.

Table 3-21. Summary of Stormwater Management Facility Inspections		
Stormwater Management Facility	Total Inspections Conducted	Enforcement Actions



Privately-Owned	66	No enforcement actions taken
Public/Permittee-Owned	5	No enforcement actions taken

**3.11.2 Summary of Maintenance Activities**

The City did not perform any significant maintenance activities on stormwater management facilities throughout the 2023 reporting year. The City performs regular inspections and maintenance activities on City owned and operated stormwater management facilities that includes grass cutting, trash collection, and debris removal.

**3.11.3 Submission Confirmation Statements**

The Water Resources Division staff of DPU has submitted stormwater management facility information through the Virginia Construction Stormwater General Permit database, and have reported BMPs through the DEQ Warehouse.

**3.12 Pollution Prevention and Good Housekeeping for Facilities Owned and Operated by the Permittee within the MS4 Service Area (MCM 6 and NCM 7)**

**3.12.1 Summary of New or Modified Operational Procedures**

No updates were made to any of the City’s operational procedures.

**3.12.2 Summary of New or Modified SWPPPs**

No updates were made to the existing SWPPP’s during the 2023 reporting year. Training is performed based on the operations outlined in the SWPPP’s.

**3.12.3 Summary of New Turf and Landscape Nutrient Management Plans**

No new Turf and Landscape Plans have been implemented within the City.

**3.12.4 Summary of Training Events**

The City conducted a training course for stormwater awareness for City employees. The course provided education on spill prevention, vehicle maintenance, bulk material storage, road and parking lot maintenance and facility maintenance. The course was completed online throughout the 2023 reporting period by 88 employees.

**3.12.5 Operation and Maintenance of Septage Receiving Station**

In the 2023 reporting year, the City received 2,068 hauled waste discharges for a total of 3.7 million gallons. The Septage Receiving Station is inspected daily and is maintained at regular intervals.

**3.12.6 Enforcement of Ordinances that prohibit substances from entering the Collection System**

In the 2023 reporting year, the City performed the following activities:

- Collected samples at 29 facilities through the Strong Waste Surcharge Program
  - Issued zero (0) Notices of Violations to Significant Industrial Users



Performed 27 inspections at Significant Industrial Users Facilities

## Section 4

# Chesapeake Bay TMDL Action Plan Status Report

### 4.1.1 Implemented BMPs

The BMPs that have been implemented by the City to achieve compliance with Chesapeake Bay TMDL Action Plan are summarized in Table 4-1. The City has not acquired any credits during the 2023 reporting year.

Table 4-1. Summary of Implemented BMPs				
BMPs	Completion Date	Pollutant Removal (lbs/year)		
		Total Nitrogen	Total Phosphorus	Total Suspended Solids
Maury Stream Restoration	2016	894.0	176.0	58,720.0
Green Alleys	2016	5.7	1.5	702.0
BMPs	2017	80.2	17.4	5,088.1
Cherokee Lake and Croatan Road	2018	872.4	198.2	16,679.8
Forest Hill	2018	1,354	298.8	25,154.9
Little Westham Creek	2019	3,180.0	1,224.0	422,000.0
Pocosham Creek	2019	4,696.0	1,061.0	354,013.0

### 4.1.2 Chesapeake Bay TMDL Action Plan Compliance Progress

The City’s progress towards meeting the required pollutant load reductions are summarized in Table 4-2.

Table 4-2. City's Chesapeake Bay TMDL Action Plan Compliance Progress						
Goal	Pollutant (lbs/year)					
	Total Nitrogen		Total Phosphorus		Total Suspended Solids	
Removal to Date (End of 2023 Reporting Year)	11,082.2		2,976.8		882,357.8	
2018 Goal	633.7	1,749%	145.5	2,046%	64,646.4	1,365%
2023 Goal	4,852.7	228.4%	1,038.0	286.8%	456,385.5	193.3%
2028 Goal	12,085.0	91.7%	2,568.0	115.9%	1,134,901.2	77.7%

### 4.1.3 Future Planned BMPs

The BMPs that are scheduled to be constructed in the future are summarized in Table 4-3.

Table 4-3. Summary of Future Planned BMPs				
BMPs	Completion Date	Pollutant Removal (lbs/year)		
		Total Nitrogen	Total Phosphorus	Total Suspended Solids
Pinecamp Stream Restoration	2024	8,091.0	3,778.0	4,620,047.0

## Section 5

# Local TMDL Action Plan Status

The City has an approved James River Bacteria TMDL Action Plan dated 11/04/2010. The City has continued to implement the CSO program nine minimum control standards and the MS4 six minimum control standards to reduce the pollutants of concern.

In 2020, the Virginia General Assembly passed, and the Governor signed into law, the 2020 CSO Law, that requires the owner or operator of any CSS east of Charlottesville that discharges into the James River watershed to submit to DEQ an Interim and Final Plan to address the requirements of any consent special order issued by the Board.

The 2020 CSO Law identifies the following dates and tasks for the owner or operator:

	Purpose	Due Date	Initiate Construction and Related Activities	Complete Construction and Related Activities
<b>Interim Plan</b>	Identifies improvements that can be initiated in the short-term	 July 1, 2021 (Complete)	 July 1, 2022 (Complete)	In Construction (1) In Procurement (2) In Design (7)  July 1, 2027
<b>Final Plan</b>	Re-evaluates the remaining 2005 Order Projects and identifies system-wide improvements	 DRAFT to DEQ March 7, 2024  July 1, 2024	 July 1, 2025  In Design (2)*	July 1, 2035
<b>TMDL Report</b>	Identifies improvements to meet the requirements of the Bacteria TMDL	July 1, 2030	In Design (2)*	December 31, 2036

The City completed the development of the Interim Plan in June 2021. The Interim Plan Projects are currently in various stages of design and procurement, as shown in Figure 5-1, and are estimated to reduce the annual combined sewage overflow volume by 182 MG.

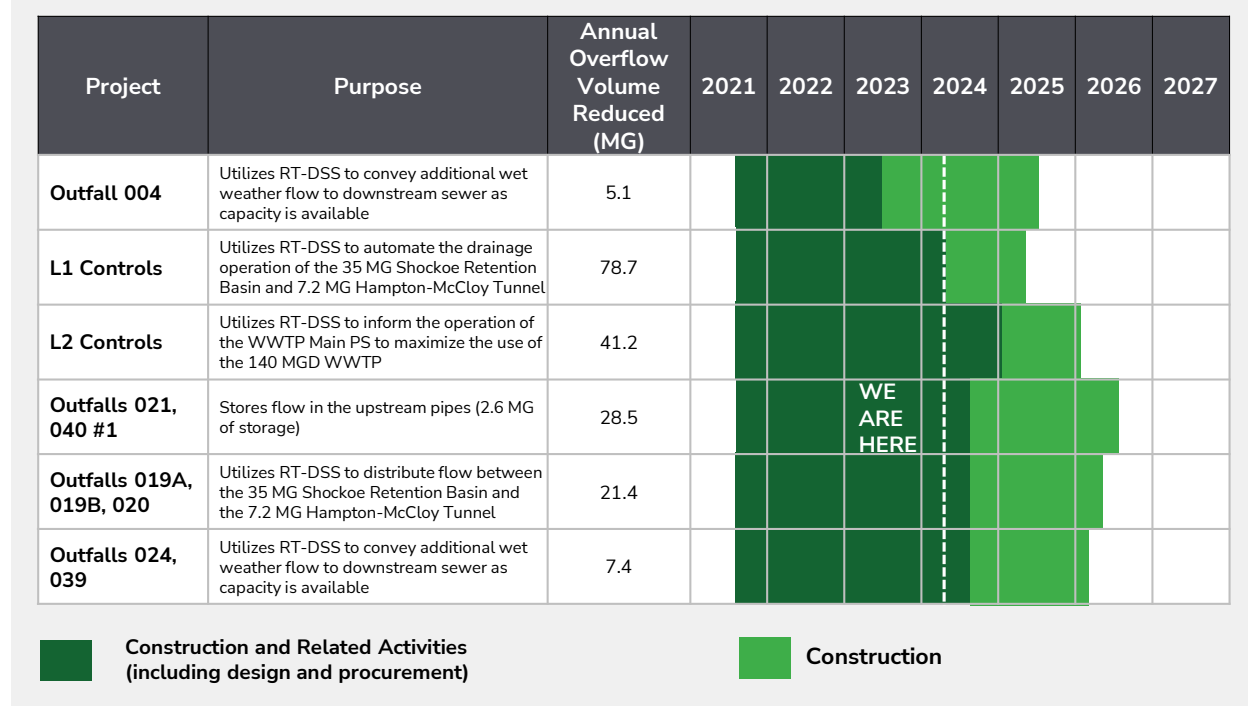


Figure 5-1: Interim Plan Project Status



Construction of Outfall 004 Interim Plan Project will reduce annual overflow events at this location by 95%, August 1, 2023.

A draft of the Final CSO Plan was submitted to the DEQ on March 7, 2024 for review. The Final CSO Plan is on track to be completed by the July 1, 2024 deadline.

## Section 6

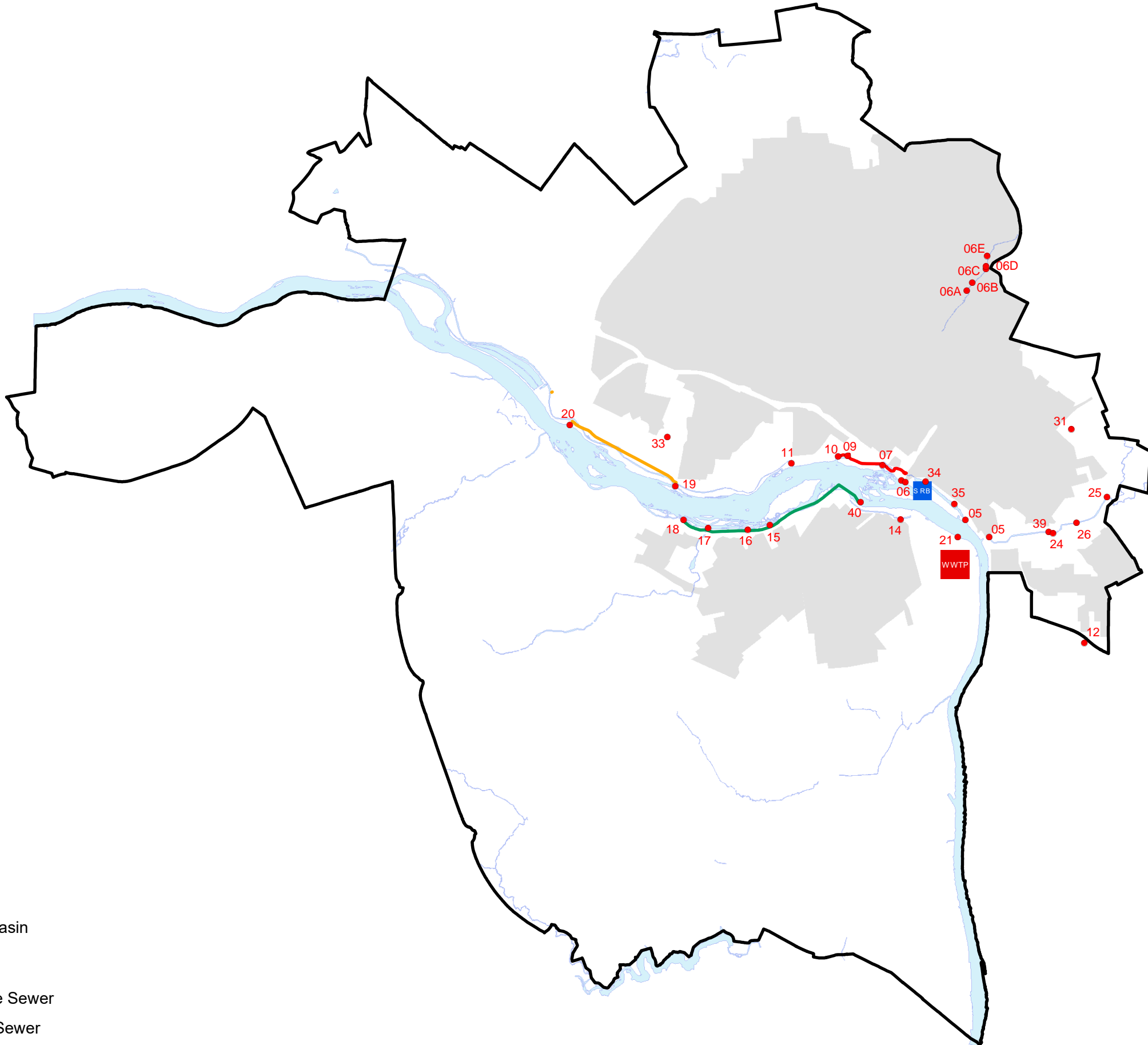
# James River and Tributary Monitoring Report

Virginia Commonwealth University (VCU) conducts water quality monitoring in the James River and its tributaries on behalf of the City. The data collected by VCU is provided in Appendix E.

## Appendix A: Richmond CSS Map

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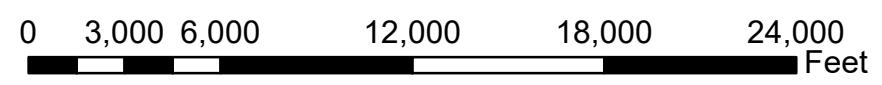




**Legend**

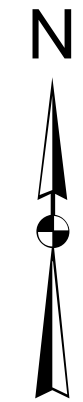
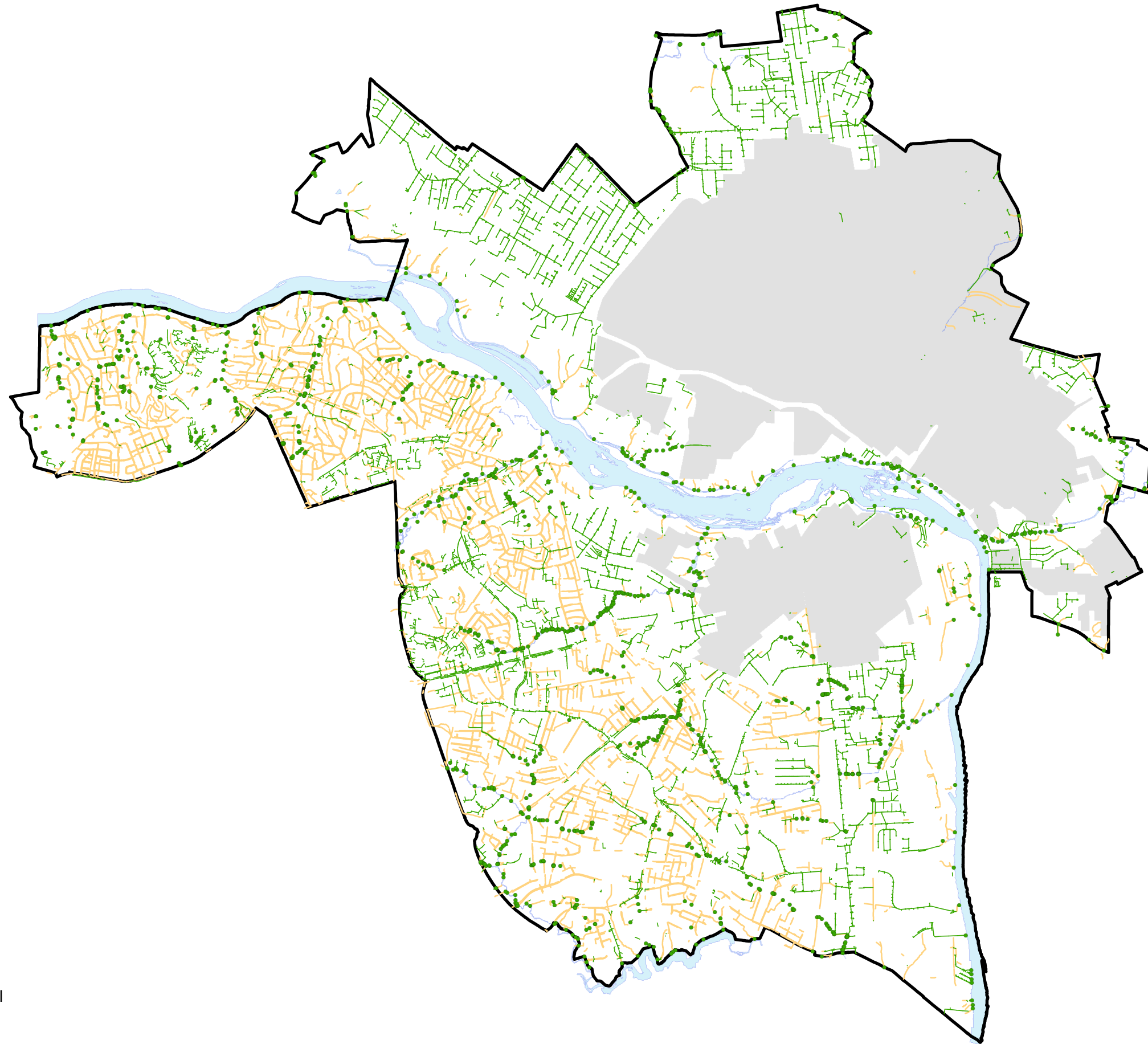
- CSO Outfalls
- S RB Shockoe Retention Basin
- WWTP
- CSO 1/2 Conveyance Sewer
- CSO 3 Conveyance Sewer
- Hampton/McCloy Tunnel
- CSS Drainage Area

**Richmond CSS**



## Appendix B: Richmond MS4 Map

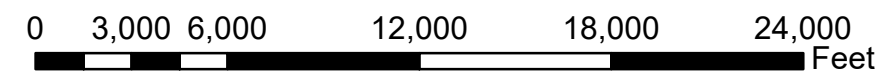
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**Legend**

- Storm System Outfall
- Storm System Pipe
- Storm System Open Channel
- CSS Drainage Area

**Richmond MS4**



## **Appendix C: Outfall Inventory Records**

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Outfall ID:	Date:	Creek:	Rain Event Past 48 hours?	Flow Present?	IDDE Potential	Odor Present?	Additional Notes:
GRC-RCB	3/7/2023 10:07	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-001	3/7/2023 10:17	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-002	3/7/2023 10:24	Grindall Creek	No	No	Unlikely	No	N/A
GRC-003	3/7/2023 10:40	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-004	3/7/2023 10:47	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-005	3/7/2023 10:56	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-006	3/7/2023 11:07	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-007	3/7/2023 11:21	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-008	3/7/2023 11:33	Grindall Creek	No	No	Unlikely	No	N/A
GRC-009	3/7/2023 11:42	Grindall Creek	No	No	Unlikely	No	N/A
GRC-010	3/7/2023 12:04	Grindall Creek	No	No	Unlikely	No	N/A
GRC-011	3/7/2023 12:55	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-012	3/7/2023 13:03	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-013	3/7/2023 13:10	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-014	3/7/2023 13:24	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-015	3/7/2023 13:30	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-016	3/7/2023 13:35	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-017	3/7/2023 13:39	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-018	3/7/2023 13:45	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-019	3/7/2023 14:00	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-020	3/7/2023 14:10	Grindall Creek	No	No	Unlikely	No	N/A
GRC-021	3/7/2023 14:23	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-023	3/9/2023 10:18	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-024	3/9/2023 10:29	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-025	3/9/2023 10:44	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed

Outfall ID:	Date:	Creek:	Rain Event Past 48 hours?	Flow Present?	IDDE Potential	Odor Present?	Additional Notes:
GRC-026	3/9/2023 11:04	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-027	3/9/2023 11:21	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-028	3/9/2023 11:56	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-029	3/9/2023 12:04	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-030	3/9/2023 12:28	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-031	3/9/2023 12:45	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-032	3/9/2023 12:55	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-033	3/9/2023 13:15	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-034	3/9/2023 13:26	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-035	3/9/2023 13:51	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-036	3/9/2023 13:56	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-037	3/9/2023 14:08	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-038	3/14/2023 10:20	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-039	3/14/2023 10:32	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-040	3/14/2023 10:43	Grindall Creek	No	No	Potential	No	Appears to Function as Designed

Outfall ID:	Date:	Creek:	Rain Event Past 48 hours?	Flow Present?	IDDE Potential	Odor Present?	Additional Notes:
GRC-041	3/14/2023 11:08	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-042	3/14/2023 11:23	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-043	3/14/2023 11:39	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-044	3/14/2023 12:03	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-045	3/14/2023 13:11	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-046	3/14/2023 13:18	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-047	3/14/2023 13:32	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-048	3/14/2023 13:45	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-049	3/14/2023 14:03	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-050	3/14/2023 14:19	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-051	3/14/2023 14:29	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-052	3/14/2023 14:36	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-053	3/15/2023 10:49	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-054	3/15/2023 10:56	Grindall Creek	No	No	Unlikely	No	Some Erosion/ Appears to function
GRC-055	3/15/2023 11:04	Grindall Creek	No	No	Unlikely	No	Liter and Debris/ Appears to function
GRC-056	3/15/2023 11:27	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-057	3/15/2023 11:44	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-058	3/15/2023 11:50	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-059	3/15/2023 12:01	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-060	3/15/2023 12:10	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-061	3/15/2023 12:19	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-062	3/15/2023 12:28	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-063	3/15/2023 12:48	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed
GRC-064	3/15/2023 13:19	Grindall Creek	No	No	Unlikely	No	Appears to Function as Designed

## **Appendix D: Illicit Discharge Records**

---



Investigation Identifier	Incident Report Date	Incident Location	Incident Summary	Resolution Summary	Follow-Up Summary	Closure Date
491821 Illicit Discharge	1/11/2023	610 Freeman Road	Citizen is reporting that a neighbor has poured bleach and a orange substance on the sidewalk which can cause harm	W. Nawabi went to investigate the incident and no issues were found	N/A	2/6/2023
495021 Illicit Discharge	2/22/2023	825 Roseneath Rd	City trash truck spilled oil down two blocks of roseneath	Went to sight and found significant oil spilled Richmond DPW or CVWMA could have be responsible. Remediated the area, and reported spill to DEQ	N/A	3/21/2023
497488 Illicit Discharge	4/2/2023	5721 Regent Cir	Piles of Asphalt was abandoned next to a creek. Contractor working at the top of the Pineway hill	Pretreatment team went to area in question, and asphalt was removed. Only rip rap was found at location	N/A	4/10/2023
497532 Illicit Discharge	4/3/2023	4408 New Kent Ave	Car is parked near storm drain and leaking gasoline.	When pretreatment responded no fuel was detected. 1955 bel air didn't seem to have issues	Went back on 4/20/2023 and area was still without issues	4/25/2023
505107 Illicit Discharge	7/5/2023	2511 Mule Barn Al	There were a number of polyurethane that have been knocked over and seeping into the ground. The rain making it go into storm drain	Cans were removed from location	N/A	7/10/2023
507472 Illicit Discharge	7/31/2023	2401 E. Franklin St	Heavy water flow out of driveway of this building. The issue is very visible concerned possible water leak	Detail are limited, but it was determined no work by storm water crew is needed for this location	N/A	8/9/2023
511273 Illicit Discharge	9/14/2023	3014 Norfolk St	Pinky's restaurant has black oily gunk running out of their area onto the public sidewalk where tenants enter, also gunk is near storm drain	Pretreatment team went to area to investigate, and did notice grease coming from rendering bin.	The FSE spill grease while pouring into bin, and grease stained the ground, but didn't make it to storm drain. Fse instructed on proper cleanup	9/15/2023
514209 Illicit Discharge	10/26/2023	5601 Westower Dr	Product being used in residential area. Neighbor thinks it not safe	Citizen called in to cancel her request. She said situation is resolved.		10/31/2023
516639 Illicit Discharge	12/1/2023	3610 Carolina Ave	Owners blow leaves in the street and leaves get into storm drains.	Determined this complaint should have went to DPW	DPW took over this issue	12/1/2023
518159 Illicit Discharge	12/18/2023	1709 N 24th St	Man living in boarded up house dumping oil, break fluid and radiator fluid into the gutter.	Pretreatment team and City of Richmond police showed up to investigate	Cars are being fixed on the street. While we moved the cars in question looking to find person to stop the activity	Still Open

## Appendix E: James River and Tributary Monitoring Data

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Sample_ID	Analyte	Result	Date	Time	Analyst
B157	TEMP_FIELD	15.2	4/11/2023	11:09	VCU
B157	PH_F	7.81	4/11/2023	11:09	VCU
B157	COND	183.6	4/11/2023	11:09	VCU
B157	DO_%	95.9	4/11/2023	11:09	VCU
B157	DO	9.62	4/11/2023	11:09	VCU
B157	TURB	3.46	4/11/2023	11:09	VCU
B157	TSS	5.91	4/11/2023	11:09	VCU
B157	ECOLI-MF	ND	4/11/2023	11:09	VCU
B157	TEMP_FIELD	20.6	4/25/2023	11:09	VCU
B157	PH_F	7.81	4/25/2023	11:09	VCU
B157	COND	203.8	4/25/2023	11:09	VCU
B157	DO_%	86.7	4/25/2023	11:09	VCU
B157	DO	7.76	4/25/2023	11:09	VCU
B157	TURB	4.88	4/25/2023	11:09	VCU
B157	TSS	6.32	4/25/2023	11:09	VCU
B157	ECOLI-MF	53	4/25/2023	11:09	VCU
B157	TEMP_FIELD	20.6	5/9/2023	11:18	VCU
B157	PH_F	7.69	5/9/2023	11:18	VCU
B157	COND	130.3	5/9/2023	11:18	VCU
B157	DO_%	95.8	5/9/2023	11:18	VCU
B157	DO	8.60	5/9/2023	11:18	VCU
B157	TURB	3.56	5/9/2023	11:18	VCU
B157	TSS	4.84	5/9/2023	11:18	VCU
B157	ECOLI-MF	19	5/9/2023	11:18	VCU
B157	TEMP_FIELD	24.2	5/23/2023	11:06	VCU
B157	PH_F	8.14	5/23/2023	11:06	VCU
B157	COND	160.3	5/23/2023	11:06	VCU
B157	DO_%	88.1	5/23/2023	11:06	VCU
B157	DO	7.37	5/23/2023	11:06	VCU
B157	TURB	4.59	5/23/2023	11:06	VCU
B157	TSS	7.57	5/23/2023	11:06	VCU
B157	ECOLI-MF	55	5/23/2023	11:06	VCU
B157	TEMP_FIELD	24.4	6/6/2023	9:13	VCU
B157	PH_F	7.93	6/6/2023	9:13	VCU
B157	COND	212.0	6/6/2023	9:13	VCU
B157	DO_%	81.9	6/6/2023	9:13	VCU
B157	DO	6.82	6/6/2023	9:13	VCU
B157	TURB	1.58	6/6/2023	9:13	VCU
B157	TSS	6.97	6/6/2023	9:13	VCU
B157	ECOLI-MF	29	6/6/2023	9:13	VCU
B157	TEMP_FIELD	26.3	6/19/2023	11:02	VCU
B157	PH_F	8.11	6/19/2023	11:02	VCU
B157	COND	298.9	6/19/2023	11:02	VCU
B157	DO_%	88.3	6/19/2023	11:02	VCU
B157	DO	7.12	6/19/2023	11:02	VCU

B157	TURB	1.05	6/19/2023	11:02	VCU
B157	TSS	5.18	6/19/2023	11:02	VCU
B157	ECOLI-MF	16	6/19/2023	11:02	VCU
B157	TEMP_FIELD	29.1	7/5/2023	10:50	VCU
B157	PH_F	7.94	7/5/2023	10:50	VCU
B157	COND	163.9	7/5/2023	10:50	VCU
B157	DO_%	94.9	7/5/2023	10:50	VCU
B157	DO	7.29	7/5/2023	10:50	VCU
B157	TURB	5.92	7/5/2023	10:50	VCU
B157	TSS	8.32	7/5/2023	10:50	VCU
B157	ECOLI-MF	62	7/5/2023	10:50	VCU
B157	TEMP_FIELD	26.4	7/18/2023	9:57	VCU
B157	PH_F	7.31	7/18/2023	9:57	VCU
B157	COND	85.2	7/18/2023	9:57	VCU
B157	DO_%	95.4	7/18/2023	9:57	VCU
B157	DO	7.69	7/18/2023	9:57	VCU
B157	TURB	74.00	7/18/2023	9:57	VCU
B157	TSS	51.78	7/18/2023	9:57	VCU
B157	ECOLI-MF	215	7/18/2023	9:57	VCU
B157	TEMP_FIELD	30.1	8/1/2023	8:31	VCU
B157	PH_F	7.90	8/1/2023	8:31	VCU
B157	COND	195.3	8/1/2023	8:31	VCU
B157	DO_%	84.0	8/1/2023	8:31	VCU
B157	DO	6.33	8/1/2023	8:31	VCU
B157	TURB	4.16	8/1/2023	8:31	VCU
B157	TSS	7.10	8/1/2023	8:31	VCU
B157	ECOLI-MF	21	8/1/2023	8:31	VCU
B157	TEMP_FIELD	29.7	8/15/2023	9:46	VCU
B157	PH_F	8.18	8/15/2023	9:46	VCU
B157	COND	214.5	8/15/2023	9:46	VCU
B157	DO_%	90.1	8/15/2023	9:46	VCU
B157	DO	6.84	8/15/2023	9:46	VCU
B157	TURB	4.55	8/15/2023	9:46	VCU
B157	TSS	64.44	8/15/2023	9:46	VCU
B157	ECOLI-MF	139	8/15/2023	9:46	VCU
B157	TEMP_FIELD	28.4	8/30/2023	10:55	VCU
B157	PH_F	7.86	8/30/2023	10:55	VCU
B157	COND	277.5	8/30/2023	10:55	VCU
B157	DO_%	79.5	8/30/2023	10:55	VCU
B157	DO	6.16	8/30/2023	10:55	VCU
B157	TURB	4.95	8/30/2023	10:55	VCU
B157	TSS	0.43	8/30/2023	10:55	VCU
B157	ECOLI-MF	97	8/30/2023	10:55	VCU
B157	TEMP_FIELD	28.8	9/13/2023	11:54	VCU
B157	PH_F	8.07	9/13/2023	11:54	VCU
B157	COND	280.3	9/13/2023	11:54	VCU
B157	DO_%	82.4	9/13/2023	11:54	VCU
B157	DO	6.35	9/13/2023	11:54	VCU
B157	TURB	3.72	9/13/2023	11:54	VCU
B157	TSS	6.06	9/13/2023	11:54	VCU
B157	ECOLI-MF	42	9/13/2023	11:54	VCU
B157	TEMP_FIELD	20.1	9/27/2023	11:22	VCU
B157	PH_F	7.48	9/27/2023	11:22	VCU

B157	COND	138.8	9/27/2023	11:22	VCU
B157	DO_%	87.5	9/27/2023	11:22	VCU
B157	DO	7.93	9/27/2023	11:22	VCU
B157	TURB	12.90	9/27/2023	11:22	VCU
B157	TSS	9.33	9/27/2023	11:22	VCU
B157	ECOLI-MF	175	9/27/2023	11:22	VCU
B157	TEMP_FIELD	21.5	10/11/2023	10:51	VCU
B157	PH_F	8.05	10/11/2023	10:51	VCU
B157	COND	281.4	10/11/2023	10:51	VCU
B157	DO_%	85.4	10/11/2023	10:51	VCU
B157	DO	7.52	10/11/2023	10:51	VCU
B157	TURB	2.04	10/11/2023	10:51	VCU
B157	TSS	5.50	10/11/2023	10:51	VCU
B157	ECOLI-MF	15	10/11/2023	10:51	VCU
B157	TEMP_FIELD	17.1	10/25/2023	10:36	VCU
B157	PH_F	8.10	10/25/2023	10:36	VCU
B157	COND	286.7	10/25/2023	10:36	VCU
B157	DO_%	87.2	10/25/2023	10:36	VCU
B157	DO	8.39	10/25/2023	10:36	VCU
B157	TURB	3.74	10/25/2023	10:36	VCU
B157	TSS	11.96	10/25/2023	10:36	VCU
B157	ECOLI-MF	30	10/25/2023	10:36	VCU
B157	TEMP_FIELD	18.0	11/8/2023	13:32	VCU
B157	PH_F	7.97	11/8/2023	13:32	VCU
B157	COND	350.1	11/8/2023	13:32	VCU
B157	DO_%	101.9	11/8/2023	13:32	VCU
B157	DO	9.65	11/8/2023	13:32	VCU
B157	TURB	7.86	11/8/2023	13:32	VCU
B157	TSS	13.34	11/8/2023	13:32	VCU
B157	ECOLI-MF	20	11/8/2023	13:32	VCU
B157	TEMP_FIELD	13.1	11/20/2023	11:13	VCU
B157	PH_F	7.76	11/20/2023	11:13	VCU
B157	COND	376.0	11/20/2023	11:13	VCU
B157	DO_%	91.8	11/20/2023	11:13	VCU
B157	DO	9.65	11/20/2023	11:13	VCU
B157	TURB	6.52	11/20/2023	11:13	VCU
B157	TSS	9.13	11/20/2023	11:13	VCU
B157	ECOLI-MF	NS	11/20/2023	11:13	VCU
B166	TEMP_FIELD	16.5	4/11/2023	11:29	VCU
B166	PH_F	7.92	4/11/2023	11:29	VCU
B166	COND	146.1	4/11/2023	11:29	VCU
B166	DO_%	98.3	4/11/2023	11:29	VCU
B166	DO	9.59	4/11/2023	11:29	VCU
B166	TURB	1.85	4/11/2023	11:29	VCU
B166	TSS	3.66	4/11/2023	11:29	VCU
B166	ECOLI-MF	ND	4/11/2023	11:29	VCU
B166	TEMP_FIELD	20.8	4/25/2023	11:33	VCU
B166	PH_F	8.15	4/25/2023	11:33	VCU
B166	COND	168.8	4/25/2023	11:33	VCU
B166	DO_%	95.3	4/25/2023	11:33	VCU
B166	DO	8.53	4/25/2023	11:33	VCU
B166	TURB	3.42	4/25/2023	11:33	VCU
B166	TSS	4.83	4/25/2023	11:33	VCU

B166	ECOLI-MF	39	4/25/2023	11:33	VCU
B166	TEMP_FIELD	20.5	5/9/2023	11:40	VCU
B166	PH_F	7.66	5/9/2023	11:40	VCU
B166	COND	124.6	5/9/2023	11:40	VCU
B166	DO_%	93.2	5/9/2023	11:40	VCU
B166	DO	8.39	5/9/2023	11:40	VCU
B166	TURB	2.92	5/9/2023	11:40	VCU
B166	TSS	NS	5/9/2023	11:40	VCU
B166	ECOLI-MF	37	5/9/2023	11:40	VCU
B166	TEMP_FIELD	24.9	5/23/2023	11:27	VCU
B166	PH_F	8.38	5/23/2023	11:27	VCU
B166	COND	154.3	5/23/2023	11:27	VCU
B166	DO_%	94.7	5/23/2023	11:27	VCU
B166	DO	7.83	5/23/2023	11:27	VCU
B166	TURB	5.14	5/23/2023	11:27	VCU
B166	TSS	13.42	5/23/2023	11:27	VCU
B166	ECOLI-MF	ND	5/23/2023	11:27	VCU
B166	TEMP_FIELD	23.6	6/6/2023	9:33	VCU
B166	PH_F	7.79	6/6/2023	9:33	VCU
B166	COND	162.3	6/6/2023	9:33	VCU
B166	DO_%	87.2	6/6/2023	9:33	VCU
B166	DO	7.39	6/6/2023	9:33	VCU
B166	TURB	1.53	6/6/2023	9:33	VCU
B166	TSS	8.62	6/6/2023	9:33	VCU
B166	ECOLI-MF	5	6/6/2023	9:33	VCU
B166	TEMP_FIELD	25.7	6/19/2023	11:26	VCU
B166	PH_F	8.13	6/19/2023	11:26	VCU
B166	COND	229.7	6/19/2023	11:26	VCU
B166	DO_%	92.1	6/19/2023	11:26	VCU
B166	DO	7.50	6/19/2023	11:26	VCU
B166	TURB	1.62	6/19/2023	11:26	VCU
B166	TSS	7.72	6/19/2023	11:26	VCU
B166	ECOLI-MF	2	6/19/2023	11:26	VCU
B166	TEMP_FIELD	30.6	7/5/2023	11:12	VCU
B166	PH_F	8.27	7/5/2023	11:12	VCU
B166	COND	127.9	7/5/2023	11:12	VCU
B166	DO_%	100.4	7/5/2023	11:12	VCU
B166	DO	7.48	7/5/2023	11:12	VCU
B166	TURB	7.89	7/5/2023	11:12	VCU
B166	TSS	4.91	7/5/2023	11:12	VCU
B166	ECOLI-MF	74	7/5/2023	11:12	VCU
B166	TEMP_FIELD	25.1	7/18/2023	10:26	VCU
B166	PH_F	7.31	7/18/2023	10:26	VCU
B166	COND	73.0	7/18/2023	10:26	VCU
B166	DO_%	97.4	7/18/2023	10:26	VCU
B166	DO	8.03	7/18/2023	10:26	VCU
B166	TURB	122.00	7/18/2023	10:26	VCU
B166	TSS	64.81	7/18/2023	10:26	VCU
B166	ECOLI-MF	302	7/18/2023	10:26	VCU
B166	TEMP_FIELD	29.8	8/1/2023	8:56	VCU
B166	PH_F	8.46	8/1/2023	8:56	VCU
B166	COND	144.6	8/1/2023	8:56	VCU
B166	DO_%	89.2	8/1/2023	8:56	VCU

B166	DO	6.77	8/1/2023	8:56	VCU
B166	TURB	4.87	8/1/2023	8:56	VCU
B166	TSS	12.33	8/1/2023	8:56	VCU
B166	ECOLI-MF	17	8/1/2023	8:56	VCU
B166	TEMP_FIELD	30.1	8/15/2023	10:09	VCU
B166	PH_F	8.07	8/15/2023	10:09	VCU
B166	COND	174.9	8/15/2023	10:09	VCU
B166	DO_%	93.9	8/15/2023	10:09	VCU
B166	DO	7.07	8/15/2023	10:09	VCU
B166	TURB	3.64	8/15/2023	10:09	VCU
B166	TSS	4.07	8/15/2023	10:09	VCU
B166	ECOLI-MF	89	8/15/2023	10:09	VCU
B166	TEMP_FIELD	27.9	8/30/2023	11:20	VCU
B166	PH_F	8.12	8/30/2023	11:20	VCU
B166	COND	218.9	8/30/2023	11:20	VCU
B166	DO_%	96.9	8/30/2023	11:20	VCU
B166	DO	7.60	8/30/2023	11:20	VCU
B166	TURB	5.11	8/30/2023	11:20	VCU
B166	TSS	1.28	8/30/2023	11:20	VCU
B166	ECOLI-MF	160	8/30/2023	11:20	VCU
B166	TEMP_FIELD	28.2	9/13/2023	12:15	VCU
B166	PH_F	8.29	9/13/2023	12:15	VCU
B166	COND	262.2	9/13/2023	12:15	VCU
B166	DO_%	96.8	9/13/2023	12:15	VCU
B166	DO	7.53	9/13/2023	12:15	VCU
B166	TURB	4.24	9/13/2023	12:15	VCU
B166	TSS	6.13	9/13/2023	12:15	VCU
B166	ECOLI-MF	50	9/13/2023	12:15	VCU
B166	TEMP_FIELD	19.9	9/27/2023	11:44	VCU
B166	PH_F	7.40	9/27/2023	11:44	VCU
B166	COND	156.1	9/27/2023	11:44	VCU
B166	DO_%	94.0	9/27/2023	11:44	VCU
B166	DO	8.56	9/27/2023	11:44	VCU
B166	TURB	5.74	9/27/2023	11:44	VCU
B166	TSS	8.54	9/27/2023	11:44	VCU
B166	ECOLI-MF	120	9/27/2023	11:44	VCU
B166	TEMP_FIELD	19.8	10/11/2023	11:13	VCU
B166	PH_F	8.03	10/11/2023	11:13	VCU
B166	COND	283.3	10/11/2023	11:13	VCU
B166	DO_%	91.8	10/11/2023	11:13	VCU
B166	DO	8.39	10/11/2023	11:13	VCU
B166	TURB	3.07	10/11/2023	11:13	VCU
B166	TSS	5.32	10/11/2023	11:13	VCU
B166	ECOLI-MF	36	10/11/2023	11:13	VCU
B166	TEMP_FIELD	16.6	10/25/2023	10:55	VCU
B166	PH_F	7.90	10/25/2023	10:55	VCU
B166	COND	253.7	10/25/2023	10:55	VCU
B166	DO_%	93.6	10/25/2023	10:55	VCU
B166	DO	9.16	10/25/2023	10:55	VCU
B166	TURB	2.57	10/25/2023	10:55	VCU
B166	TSS	5.64	10/25/2023	10:55	VCU
B166	ECOLI-MF	36	10/25/2023	10:55	VCU
B166	TEMP_FIELD	NS	11/8/2023	NS	VCU

B166	PH_F	NS	11/8/2023	NS	VCU
B166	COND	NS	11/8/2023	NS	VCU
B166	DO_%	NS	11/8/2023	NS	VCU
B166	DO	NS	11/8/2023	NS	VCU
B166	TURB	NS	11/8/2023	NS	VCU
B166	TSS	NS	11/8/2023	NS	VCU
B166	ECOLI-MF	NS	11/8/2023	NS	VCU
B166	TEMP_FIELD	NS	11/20/2023	NS	VCU
B166	PH_F	NS	11/20/2023	NS	VCU
B166	COND	NS	11/20/2023	NS	VCU
B166	DO_%	NS	11/20/2023	NS	VCU
B166	DO	NS	11/20/2023	NS	VCU
B166	TURB	NS	11/20/2023	NS	VCU
B166	TSS	NS	11/20/2023	NS	VCU
B166	ECOLI-MF	NS	11/20/2023	NS	VCU
B166 (Shore)	TEMP_FIELD	18.7	4/5/2023	14:15	VCU
B166 (Shore)	PH_F	7.81	4/5/2023	14:15	VCU
B166 (Shore)	COND	164.7	4/5/2023	14:15	VCU
B166 (Shore)	DO_%	97.1	4/5/2023	14:15	VCU
B166 (Shore)	DO	9.06	4/5/2023	14:15	VCU
B166 (Shore)	TURB	2.66	4/5/2023	14:15	VCU
B166 (Shore)	TSS	4.62	4/5/2023	14:15	VCU
B166 (Shore)	ECOLI-MF	25	4/5/2023	14:15	VCU
B166 (Shore)	TEMP_FIELD	16.3	4/11/2023	11:30	VCU
B166 (Shore)	PH_F	7.87	4/11/2023	11:30	VCU
B166 (Shore)	COND	145.6	4/11/2023	11:30	VCU
B166 (Shore)	DO_%	97.9	4/11/2023	11:30	VCU
B166 (Shore)	DO	9.63	4/11/2023	11:30	VCU
B166 (Shore)	TURB	2.23	4/11/2023	11:30	VCU
B166 (Shore)	TSS	3.33	4/11/2023	11:30	VCU
B166 (Shore)	ECOLI-MF	ND	4/11/2023	11:30	VCU
B166 (Shore)	TEMP_FIELD	21.0	4/18/2023	13:37	VCU
B166 (Shore)	PH_F	7.83	4/18/2023	13:37	VCU
B166 (Shore)	COND	159.3	4/18/2023	13:37	VCU
B166 (Shore)	DO_%	91.8	4/18/2023	13:37	VCU
B166 (Shore)	DO	8.18	4/18/2023	13:37	VCU
B166 (Shore)	TURB	2.71	4/18/2023	13:37	VCU
B166 (Shore)	TSS	4.65	4/18/2023	13:37	VCU
B166 (Shore)	ECOLI-MF	7	4/18/2023	13:37	VCU
B166 (Shore)	TEMP_FIELD	20.4	4/25/2023	11:34	VCU
B166 (Shore)	PH_F	8.11	4/25/2023	11:34	VCU
B166 (Shore)	COND	169.5	4/25/2023	11:34	VCU
B166 (Shore)	DO_%	94.6	4/25/2023	11:34	VCU
B166 (Shore)	DO	8.49	4/25/2023	11:34	VCU
B166 (Shore)	TURB	2.89	4/25/2023	11:34	VCU
B166 (Shore)	TSS	8.11	4/25/2023	11:34	VCU
B166 (Shore)	ECOLI-MF	70	4/25/2023	11:34	VCU
B166 (Shore)	TEMP_FIELD	16.0	5/2/2023	13:13	VCU
B166 (Shore)	PH_F	7.21	5/2/2023	13:13	VCU
B166 (Shore)	COND	126.2	5/2/2023	13:13	VCU
B166 (Shore)	DO_%	96.6	5/2/2023	13:13	VCU
B166 (Shore)	DO	9.53	5/2/2023	13:13	VCU
B166 (Shore)	TURB	16.60	5/2/2023	13:13	VCU



B166 (Shore)	TSS	35.40	5/2/2023	13:13	VCU
B166 (Shore)	ECOLI-MF	111	5/2/2023	13:13	VCU
B166 (Shore)	TEMP_FIELD	20.4	5/9/2023	11:41	VCU
B166 (Shore)	PH_F	7.63	5/9/2023	11:41	VCU
B166 (Shore)	COND	124.8	5/9/2023	11:41	VCU
B166 (Shore)	DO_%	93.2	5/9/2023	11:41	VCU
B166 (Shore)	DO	8.46	5/9/2023	11:41	VCU
B166 (Shore)	TURB	1.97	5/9/2023	11:41	VCU
B166 (Shore)	TSS	9.75	5/9/2023	11:41	VCU
B166 (Shore)	ECOLI-MF	42	5/9/2023	11:41	VCU
B166 (Shore)	TEMP_FIELD	22.6	5/16/2023	13:01	VCU
B166 (Shore)	PH_F	7.73	5/16/2023	13:01	VCU
B166 (Shore)	COND	141.1	5/16/2023	13:01	VCU
B166 (Shore)	DO_%	92.4	5/16/2023	13:01	VCU
B166 (Shore)	DO	7.98	5/16/2023	13:01	VCU
B166 (Shore)	TURB	1.26	5/16/2023	13:01	VCU
B166 (Shore)	TSS	4.54	5/16/2023	13:01	VCU
B166 (Shore)	ECOLI-MF	50	5/16/2023	13:01	VCU
B166 (Shore)	TEMP_FIELD	24.7	5/23/2023	11:28	VCU
B166 (Shore)	PH_F	8.43	5/23/2023	11:28	VCU
B166 (Shore)	COND	155.5	5/23/2023	11:28	VCU
B166 (Shore)	DO_%	94.4	5/23/2023	11:28	VCU
B166 (Shore)	DO	7.82	5/23/2023	11:28	VCU
B166 (Shore)	TURB	3.42	5/23/2023	11:28	VCU
B166 (Shore)	TSS	16.97	5/23/2023	11:28	VCU
B166 (Shore)	ECOLI-MF	55	5/23/2023	11:28	VCU
B166 (Shore)	TEMP_FIELD	21.5	5/30/2023	12:59	VCU
B166 (Shore)	PH_F	7.84	5/30/2023	12:59	VCU
B166 (Shore)	COND	177.8	5/30/2023	12:59	VCU
B166 (Shore)	DO_%	94.9	5/30/2023	12:59	VCU
B166 (Shore)	DO	8.38	5/30/2023	12:59	VCU
B166 (Shore)	TURB	4.59	5/30/2023	12:59	VCU
B166 (Shore)	TSS	5.48	5/30/2023	12:59	VCU
B166 (Shore)	ECOLI-MF	83	5/30/2023	12:59	VCU
B166 (Shore)	TEMP_FIELD	23.5	6/6/2023	9:34	VCU
B166 (Shore)	PH_F	7.76	6/6/2023	9:34	VCU
B166 (Shore)	COND	163.8	6/6/2023	9:34	VCU
B166 (Shore)	DO_%	87.0	6/6/2023	9:34	VCU
B166 (Shore)	DO	7.43	6/6/2023	9:34	VCU
B166 (Shore)	TURB	1.44	6/6/2023	9:34	VCU
B166 (Shore)	TSS	4.69	6/6/2023	9:34	VCU
B166 (Shore)	ECOLI-MF	41	6/6/2023	9:34	VCU
B166 (Shore)	TEMP_FIELD	25.7	6/13/2023	12:58	VCU
B166 (Shore)	PH_F	8.20	6/13/2023	12:58	VCU
B166 (Shore)	COND	209.2	6/13/2023	12:58	VCU
B166 (Shore)	DO_%	94.7	6/13/2023	12:58	VCU
B166 (Shore)	DO	7.72	6/13/2023	12:58	VCU
B166 (Shore)	TURB	1.54	6/13/2023	12:58	VCU
B166 (Shore)	TSS	4.45	6/13/2023	12:58	VCU
B166 (Shore)	ECOLI-MF	25	6/13/2023	12:58	VCU
B166 (Shore)	TEMP_FIELD	25.8	6/19/2023	11:27	VCU
B166 (Shore)	PH_F	8.13	6/19/2023	11:27	VCU
B166 (Shore)	COND	229.8	6/19/2023	11:27	VCU

B166 (Shore)	DO_%	92.8	6/19/2023	11:27	VCU
B166 (Shore)	DO	7.52	6/19/2023	11:27	VCU
B166 (Shore)	TURB	1.98	6/19/2023	11:27	VCU
B166 (Shore)	TSS	4.55	6/19/2023	11:27	VCU
B166 (Shore)	ECOLI-MF	18	6/19/2023	11:27	VCU
B166 (Shore)	TEMP_FIELD	24.8	6/27/2023	10:50	VCU
B166 (Shore)	PH_F	7.67	6/27/2023	10:50	VCU
B166 (Shore)	COND	150.3	6/27/2023	10:50	VCU
B166 (Shore)	DO_%	95.0	6/27/2023	10:50	VCU
B166 (Shore)	DO	7.91	6/27/2023	10:50	VCU
B166 (Shore)	TURB	1.22	6/27/2023	10:50	VCU
B166 (Shore)	TSS	4.63	6/27/2023	10:50	VCU
B166 (Shore)	ECOLI-MF	177	6/27/2023	10:50	VCU
B166 (Shore)	TEMP_FIELD	30.5	7/5/2023	11:13	VCU
B166 (Shore)	PH_F	8.29	7/5/2023	11:13	VCU
B166 (Shore)	COND	124.5	7/5/2023	11:13	VCU
B166 (Shore)	DO_%	97.9	7/5/2023	11:13	VCU
B166 (Shore)	DO	7.33	7/5/2023	11:13	VCU
B166 (Shore)	TURB	2.22	7/5/2023	11:13	VCU
B166 (Shore)	TSS	7.13	7/5/2023	11:13	VCU
B166 (Shore)	ECOLI-MF	113	7/5/2023	11:13	VCU
B166 (Shore)	TEMP_FIELD	28.4	7/11/2023	12:05	VCU
B166 (Shore)	PH_F	8.03	7/11/2023	12:05	VCU
B166 (Shore)	COND	140.0	7/11/2023	12:05	VCU
B166 (Shore)	DO_%	94.8	7/11/2023	12:05	VCU
B166 (Shore)	DO	7.37	7/11/2023	12:05	VCU
B166 (Shore)	TURB	4.48	7/11/2023	12:05	VCU
B166 (Shore)	TSS	4.77	7/11/2023	12:05	VCU
B166 (Shore)	ECOLI-MF	196	7/11/2023	12:05	VCU
B166 (Shore)	TEMP_FIELD	25.1	7/18/2023	10:27	VCU
B166 (Shore)	PH_F	7.28	7/18/2023	10:27	VCU
B166 (Shore)	COND	73.8	7/18/2023	10:27	VCU
B166 (Shore)	DO_%	97.6	7/18/2023	10:27	VCU
B166 (Shore)	DO	8.04	7/18/2023	10:27	VCU
B166 (Shore)	TURB	100.00	7/18/2023	10:27	VCU
B166 (Shore)	TSS	128.47	7/18/2023	10:27	VCU
B166 (Shore)	ECOLI-MF	504	7/18/2023	10:27	VCU
B166 (Shore)	TEMP_FIELD	29.6	7/25/2023	13:20	VCU
B166 (Shore)	PH_F	8.27	7/25/2023	13:20	VCU
B166 (Shore)	COND	124.8	7/25/2023	13:20	VCU
B166 (Shore)	DO_%	100.6	7/25/2023	13:20	VCU
B166 (Shore)	DO	7.65	7/25/2023	13:20	VCU
B166 (Shore)	TURB	6.54	7/25/2023	13:20	VCU
B166 (Shore)	TSS	4.87	7/25/2023	13:20	VCU
B166 (Shore)	ECOLI-MF	183	7/25/2023	13:20	VCU
B166 (Shore)	TEMP_FIELD	28.8	8/1/2023	8:57	VCU
B166 (Shore)	PH_F	8.26	8/1/2023	8:57	VCU
B166 (Shore)	COND	146.8	8/1/2023	8:57	VCU
B166 (Shore)	DO_%	93.6	8/1/2023	8:57	VCU
B166 (Shore)	DO	7.22	8/1/2023	8:57	VCU
B166 (Shore)	TURB	6.20	8/1/2023	8:57	VCU
B166 (Shore)	TSS	9.22	8/1/2023	8:57	VCU
B166 (Shore)	ECOLI-MF	53	8/1/2023	8:57	VCU

B166 (Shore)	TEMP_FIELD	28.8	8/8/2023	11:30	VCU
B166 (Shore)	PH_F	8.07	8/8/2023	11:30	VCU
B166 (Shore)	COND	159.4	8/8/2023	11:30	VCU
B166 (Shore)	DO_%	100.7	8/8/2023	11:30	VCU
B166 (Shore)	DO	7.78	8/8/2023	11:30	VCU
B166 (Shore)	TURB	2.48	8/8/2023	11:30	VCU
B166 (Shore)	TSS	5.03	8/8/2023	11:30	VCU
B166 (Shore)	ECOLI-MF	100	8/8/2023	11:30	VCU
B166 (Shore)	TEMP_FIELD	30.1	8/15/2023	10:10	VCU
B166 (Shore)	PH_F	8.08	8/15/2023	10:10	VCU
B166 (Shore)	COND	176.5	8/15/2023	10:10	VCU
B166 (Shore)	DO_%	94.3	8/15/2023	10:10	VCU
B166 (Shore)	DO	7.11	8/15/2023	10:10	VCU
B166 (Shore)	TURB	2.44	8/15/2023	10:10	VCU
B166 (Shore)	TSS	4.54	8/15/2023	10:10	VCU
B166 (Shore)	ECOLI-MF	93	8/15/2023	10:10	VCU
B166 (Shore)	TEMP_FIELD	28.4	8/23/2023	11:04	VCU
B166 (Shore)	PH_F	8.27	8/23/2023	11:04	VCU
B166 (Shore)	COND	233.2	8/23/2023	11:04	VCU
B166 (Shore)	DO_%	94.6	8/23/2023	11:04	VCU
B166 (Shore)	DO	7.35	8/23/2023	11:04	VCU
B166 (Shore)	TURB	3.29	8/23/2023	11:04	VCU
B166 (Shore)	TSS	3.84	8/23/2023	11:04	VCU
B166 (Shore)	ECOLI-MF	25	8/23/2023	11:04	VCU
B166 (Shore)	TEMP_FIELD	28.0	8/30/2023	11:21	VCU
B166 (Shore)	PH_F	8.13	8/30/2023	11:21	VCU
B166 (Shore)	COND	220.1	8/30/2023	11:21	VCU
B166 (Shore)	DO_%	96.7	8/30/2023	11:21	VCU
B166 (Shore)	DO	7.52	8/30/2023	11:21	VCU
B166 (Shore)	TURB	6.43	8/30/2023	11:21	VCU
B166 (Shore)	TSS	16.30	8/30/2023	11:21	VCU
B166 (Shore)	ECOLI-MF	183	8/30/2023	11:21	VCU
B166 (Shore)	TEMP_FIELD	29.1	9/6/2023	12:59	VCU
B166 (Shore)	PH_F	8.54	9/6/2023	12:59	VCU
B166 (Shore)	COND	165.3	9/6/2023	12:59	VCU
B166 (Shore)	DO_%	93.5	9/6/2023	12:59	VCU
B166 (Shore)	DO	7.18	9/6/2023	12:59	VCU
B166 (Shore)	TURB	3.27	9/6/2023	12:59	VCU
B166 (Shore)	TSS	3.57	9/6/2023	12:59	VCU
B166 (Shore)	ECOLI-MF	23	9/6/2023	12:59	VCU
B166 (Shore)	TEMP_FIELD	28.3	9/13/2023	12:14	VCU
B166 (Shore)	PH_F	8.26	9/13/2023	12:14	VCU
B166 (Shore)	COND	262.8	9/13/2023	12:14	VCU
B166 (Shore)	DO_%	96.4	9/13/2023	12:14	VCU
B166 (Shore)	DO	7.50	9/13/2023	12:14	VCU
B166 (Shore)	TURB	2.98	9/13/2023	12:14	VCU
B166 (Shore)	TSS	5.77	9/13/2023	12:14	VCU
B166 (Shore)	ECOLI-MF	43	9/13/2023	12:14	VCU
B166 (Shore)	TEMP_FIELD	23.7	9/20/2023	7:50	VCU
B166 (Shore)	PH_F	7.63	9/20/2023	7:50	VCU
B166 (Shore)	COND	254.7	9/20/2023	7:50	VCU
B166 (Shore)	DO_%	85.9	9/20/2023	7:50	VCU
B166 (Shore)	DO	7.28	9/20/2023	7:50	VCU

B166 (Shore)	TURB	4.66	9/20/2023	7:50	VCU
B166 (Shore)	TSS	7.58	9/20/2023	7:50	VCU
B166 (Shore)	ECOLI-MF	97	9/20/2023	7:50	VCU
B166 (Shore)	TEMP_FIELD	19.8	9/27/2023	11:45	VCU
B166 (Shore)	PH_F	7.42	9/27/2023	11:45	VCU
B166 (Shore)	COND	158.2	9/27/2023	11:45	VCU
B166 (Shore)	DO_%	95.1	9/27/2023	11:45	VCU
B166 (Shore)	DO	8.75	9/27/2023	11:45	VCU
B166 (Shore)	TURB	7.94	9/27/2023	11:45	VCU
B166 (Shore)	TSS	6.68	9/27/2023	11:45	VCU
B166 (Shore)	ECOLI-MF	129	9/27/2023	11:45	VCU
B166 (Shore)	TEMP_FIELD	21.9	10/4/2023	10:09	VCU
B166 (Shore)	PH_F	7.98	10/4/2023	10:09	VCU
B166 (Shore)	COND	208.6	10/4/2023	10:09	VCU
B166 (Shore)	DO_%	92.9	10/4/2023	10:09	VCU
B166 (Shore)	DO	8.14	10/4/2023	10:09	VCU
B166 (Shore)	TURB	3.12	10/4/2023	10:09	VCU
B166 (Shore)	TSS	3.85	10/4/2023	10:09	VCU
B166 (Shore)	ECOLI-MF	47	10/4/2023	10:09	VCU
B166 (Shore)	TEMP_FIELD	19.7	10/11/2023	11:11	VCU
B166 (Shore)	PH_F	8.03	10/11/2023	11:11	VCU
B166 (Shore)	COND	280.4	10/11/2023	11:11	VCU
B166 (Shore)	DO_%	92.9	10/11/2023	11:11	VCU
B166 (Shore)	DO	8.50	10/11/2023	11:11	VCU
B166 (Shore)	TURB	2.06	10/11/2023	11:11	VCU
B166 (Shore)	TSS	4.39	10/11/2023	11:11	VCU
B166 (Shore)	ECOLI-MF	44	10/11/2023	11:11	VCU
B166 (Shore)	TEMP_FIELD	17.0	10/18/2023	10:43	VCU
B166 (Shore)	PH_F	8.24	10/18/2023	10:43	VCU
B166 (Shore)	COND	303.3	10/18/2023	10:43	VCU
B166 (Shore)	DO_%	95.8	10/18/2023	10:43	VCU
B166 (Shore)	DO	9.25	10/18/2023	10:43	VCU
B166 (Shore)	TURB	1.84	10/18/2023	10:43	VCU
B166 (Shore)	TSS	3.01	10/18/2023	10:43	VCU
B166 (Shore)	ECOLI-MF	134	10/18/2023	10:43	VCU
B166 (Shore)	TEMP_FIELD	16.6	10/25/2023	10:54	VCU
B166 (Shore)	PH_F	7.89	10/25/2023	10:54	VCU
B166 (Shore)	COND	250.8	10/25/2023	10:54	VCU
B166 (Shore)	DO_%	94.4	10/25/2023	10:54	VCU
B166 (Shore)	DO	9.20	10/25/2023	10:54	VCU
B166 (Shore)	TURB	3.76	10/25/2023	10:54	VCU
B166 (Shore)	TSS	4.53	10/25/2023	10:54	VCU
B166 (Shore)	ECOLI-MF	44	10/25/2023	10:54	VCU
B166 (Shore)	TEMP_FIELD	18.7	11/1/2023	11:47	VCU
B166 (Shore)	PH_F	7.84	11/1/2023	11:47	VCU
B166 (Shore)	COND	285.8	11/1/2023	11:47	VCU
B166 (Shore)	DO_%	84.3	11/1/2023	11:47	VCU
B166 (Shore)	DO	7.86	11/1/2023	11:47	VCU
B166 (Shore)	TURB	3.68	11/1/2023	11:47	VCU
B166 (Shore)	TSS	4.06	11/1/2023	11:47	VCU
B166 (Shore)	ECOLI-MF	48	11/1/2023	11:47	VCU
B166 (Shore)	TEMP_FIELD	15.4	11/8/2023	14:04	VCU
B166 (Shore)	PH_F	8.15	11/8/2023	14:04	VCU

B166 (Shore)	COND	332.1	11/8/2023	14:04	VCU
B166 (Shore)	DO_%	99.0	11/8/2023	14:04	VCU
B166 (Shore)	DO	9.89	11/8/2023	14:04	VCU
B166 (Shore)	TURB	1.36	11/8/2023	14:04	VCU
B166 (Shore)	TSS	2.59	11/8/2023	14:04	VCU
B166 (Shore)	ECOLI-MF	55	11/8/2023	14:04	VCU
B166 (Shore)	TEMP_FIELD	12.9	11/15/2023	12:25	VCU
B166 (Shore)	PH_F	8.10	11/15/2023	12:25	VCU
B166 (Shore)	COND	313.5	11/15/2023	12:25	VCU
B166 (Shore)	DO_%	99.4	11/15/2023	12:25	VCU
B166 (Shore)	DO	10.48	11/15/2023	12:25	VCU
B166 (Shore)	TURB	1.44	11/15/2023	12:25	VCU
B166 (Shore)	TSS	1.31	11/15/2023	12:25	VCU
B166 (Shore)	ECOLI-MF	30	11/15/2023	12:25	VCU
B166 (Shore)	TEMP_FIELD	12.9	11/20/2023	12:35	VCU
B166 (Shore)	PH_F	8.00	11/20/2023	12:35	VCU
B166 (Shore)	COND	291.7	11/20/2023	12:35	VCU
B166 (Shore)	DO_%	96.1	11/20/2023	12:35	VCU
B166 (Shore)	DO	10.14	11/20/2023	12:35	VCU
B166 (Shore)	TURB	2.58	11/20/2023	12:35	VCU
B166 (Shore)	TSS	2.09	11/20/2023	12:35	VCU
B166 (Shore)	ECOLI-MF	35	11/20/2023	12:35	VCU
B166 (Shore)	TEMP_FIELD	7.2	11/29/2023	12:12	VCU
B166 (Shore)	PH_F	7.87	11/29/2023	12:12	VCU
B166 (Shore)	COND	216.4	11/29/2023	12:12	VCU
B166 (Shore)	DO_%	99.6	11/29/2023	12:12	VCU
B166 (Shore)	DO	12.03	11/29/2023	12:12	VCU
B166 (Shore)	TURB	4.83	11/29/2023	12:12	VCU
B166 (Shore)	TSS	3.57	11/29/2023	12:12	VCU
B166 (Shore)	ECOLI-MF	46	11/29/2023	12:12	VCU
Broad Rock	TEMP_FIELD	15.8	4/13/2023	11:21	VCU
Broad Rock	PH_F	7.49	4/13/2023	11:21	VCU
Broad Rock	COND	131.1	4/13/2023	11:21	VCU
Broad Rock	DO_%	101.9	4/13/2023	11:21	VCU
Broad Rock	DO	10.11	4/13/2023	11:21	VCU
Broad Rock	TURB	1.31	4/13/2023	11:21	VCU
Broad Rock	TSS	1.56	4/13/2023	11:21	VCU
Broad Rock	ECOLI-MF	ND	4/13/2023	11:21	VCU
Broad Rock	DISCHARGE	0.019	4/13/2023	11:21	VCU
Broad Rock	TEMP_FIELD	14.4	4/27/2023	11:23	VCU
Broad Rock	PH_F	7.22	4/27/2023	11:23	VCU
Broad Rock	COND	129.5	4/27/2023	11:23	VCU
Broad Rock	DO_%	98.7	4/27/2023	11:23	VCU
Broad Rock	DO	10.09	4/27/2023	11:23	VCU
Broad Rock	TURB	1.61	4/27/2023	11:23	VCU
Broad Rock	TSS	1.16	4/27/2023	11:23	VCU
Broad Rock	ECOLI-MF	42	4/27/2023	11:23	VCU
Broad Rock	DISCHARGE	0.015	4/27/2023	11:23	VCU
Broad Rock	TEMP_FIELD	16.3	5/11/2023	10:39	VCU
Broad Rock	PH_F	7.47	5/11/2023	10:39	VCU
Broad Rock	COND	127.2	5/11/2023	10:39	VCU
Broad Rock	DO_%	98.8	5/11/2023	10:39	VCU
Broad Rock	DO	9.69	5/11/2023	10:39	VCU

Broad Rock	TURB	1.34	5/11/2023	10:39	VCU
Broad Rock	TSS	1.26	5/11/2023	10:39	VCU
Broad Rock	ECOLI-MF	102	5/11/2023	10:39	VCU
Broad Rock	DISCHARGE	0.021	5/11/2023	10:39	VCU
Broad Rock	TEMP_FIELD	16.6	5/25/2023	10:25	VCU
Broad Rock	PH_F	7.20	5/25/2023	10:25	VCU
Broad Rock	COND	128.9	5/25/2023	10:25	VCU
Broad Rock	DO_%	97.9	5/25/2023	10:25	VCU
Broad Rock	DO	9.53	5/25/2023	10:25	VCU
Broad Rock	TURB	2.57	5/25/2023	10:25	VCU
Broad Rock	TSS	3.02	5/25/2023	10:25	VCU
Broad Rock	ECOLI-MF	44	5/25/2023	10:25	VCU
Broad Rock	DISCHARGE	0.041	5/25/2023	10:25	VCU
Broad Rock	TEMP_FIELD	18.0	6/8/2023	10:45	VCU
Broad Rock	PH_F	7.39	6/8/2023	10:45	VCU
Broad Rock	COND	136.7	6/8/2023	10:45	VCU
Broad Rock	DO_%	95.5	6/8/2023	10:45	VCU
Broad Rock	DO	9.04	6/8/2023	10:45	VCU
Broad Rock	TURB	0.99	6/8/2023	10:45	VCU
Broad Rock	TSS	1.36	6/8/2023	10:45	VCU
Broad Rock	ECOLI-MF	109	6/8/2023	10:45	VCU
Broad Rock	DISCHARGE	0.018	6/8/2023	10:45	VCU
Broad Rock	TEMP_FIELD	20.7	6/22/2023	12:00	VCU
Broad Rock	PH_F	7.40	6/22/2023	12:00	VCU
Broad Rock	COND	123.9	6/22/2023	12:00	VCU
Broad Rock	DO_%	88.0	6/22/2023	12:00	VCU
Broad Rock	DO	7.89	6/22/2023	12:00	VCU
Broad Rock	TURB	1.85	6/22/2023	12:00	VCU
Broad Rock	TSS	3.94	6/22/2023	12:00	VCU
Broad Rock	ECOLI-MF	TNTC	6/22/2023	12:00	VCU
Broad Rock	DISCHARGE	0.019	6/22/2023	12:00	VCU
Broad Rock	TEMP_FIELD	24.5	7/6/2023	10:43	VCU
Broad Rock	PH_F	7.13	7/6/2023	10:43	VCU
Broad Rock	COND	58.8	7/6/2023	10:43	VCU
Broad Rock	DO_%	93.0	7/6/2023	10:43	VCU
Broad Rock	DO	7.76	7/6/2023	10:43	VCU
Broad Rock	TURB	2.94	7/6/2023	10:43	VCU
Broad Rock	TSS	7.14	7/6/2023	10:43	VCU
Broad Rock	ECOLI-MF	>1200	7/6/2023	10:43	VCU
Broad Rock	DISCHARGE	0.062	7/6/2023	10:43	VCU
Broad Rock	TEMP_FIELD	23.7	7/20/2023	10:23	VCU
Broad Rock	PH_F	7.45	7/20/2023	10:23	VCU
Broad Rock	COND	125.8	7/20/2023	10:23	VCU
Broad Rock	DO_%	96.4	7/20/2023	10:23	VCU
Broad Rock	DO	8.16	7/20/2023	10:23	VCU
Broad Rock	TURB	1.30	7/20/2023	10:23	VCU
Broad Rock	TSS	1.07	7/20/2023	10:23	VCU
Broad Rock	ECOLI-MF	197	7/20/2023	10:23	VCU
Broad Rock	DISCHARGE	0.025	7/20/2023	10:23	VCU
Broad Rock	TEMP_FIELD	21.1	8/3/2023	9:35	VCU
Broad Rock	PH_F	7.54	8/3/2023	9:35	VCU
Broad Rock	COND	141.0	8/3/2023	9:35	VCU
Broad Rock	DO_%	97.7	8/3/2023	9:35	VCU

Broad Rock	DO	8.69	8/3/2023	9:35	VCU
Broad Rock	TURB	1.48	8/3/2023	9:35	VCU
Broad Rock	TSS	1.28	8/3/2023	9:35	VCU
Broad Rock	ECOLI-MF	182	8/3/2023	9:35	VCU
Broad Rock	DISCHARGE	0.011	8/3/2023	9:35	VCU
Broad Rock	TEMP_FIELD	23.7	8/17/2023	10:21	VCU
Broad Rock	PH_F	7.52	8/17/2023	10:21	VCU
Broad Rock	COND	143.5	8/17/2023	10:21	VCU
Broad Rock	DO_%	95.6	8/17/2023	10:21	VCU
Broad Rock	DO	8.08	8/17/2023	10:21	VCU
Broad Rock	TURB	0.89	8/17/2023	10:21	VCU
Broad Rock	TSS	0.20	8/17/2023	10:21	VCU
Broad Rock	ECOLI-MF	94	8/17/2023	10:21	VCU
Broad Rock	DISCHARGE	0.010	8/17/2023	10:21	VCU
Broad Rock	TEMP_FIELD	23.3	8/29/2023	10:09	VCU
Broad Rock	PH_F	7.31	8/29/2023	10:09	VCU
Broad Rock	COND	106.7	8/29/2023	10:09	VCU
Broad Rock	DO_%	91.4	8/29/2023	10:09	VCU
Broad Rock	DO	7.79	8/29/2023	10:09	VCU
Broad Rock	TURB	1.77	8/29/2023	10:09	VCU
Broad Rock	TSS	1.45	8/29/2023	10:09	VCU
Broad Rock	ECOLI-MF	40	8/29/2023	10:09	VCU
Broad Rock	DISCHARGE	0.019	8/29/2023	10:09	VCU
Broad Rock	TEMP_FIELD	23.0	9/12/2023	10:05	VCU
Broad Rock	PH_F	7.44	9/12/2023	10:05	VCU
Broad Rock	COND	123.1	9/12/2023	10:05	VCU
Broad Rock	DO_%	94.8	9/12/2023	10:05	VCU
Broad Rock	DO	8.15	9/12/2023	10:05	VCU
Broad Rock	TURB	1.72	9/12/2023	10:05	VCU
Broad Rock	TSS	1.07	9/12/2023	10:05	VCU
Broad Rock	ECOLI-MF	104	9/12/2023	10:05	VCU
Broad Rock	DISCHARGE	0.012	9/12/2023	10:05	VCU
Broad Rock	TEMP_FIELD	19.4	9/26/2023	9:52	VCU
Broad Rock	PH_F	7.47	9/26/2023	9:52	VCU
Broad Rock	COND	138.4	9/26/2023	9:52	VCU
Broad Rock	DO_%	99.2	9/26/2023	9:52	VCU
Broad Rock	DO	9.12	9/26/2023	9:52	VCU
Broad Rock	TURB	2.52	9/26/2023	9:52	VCU
Broad Rock	TSS	0.66	9/26/2023	9:52	VCU
Broad Rock	ECOLI-MF	1	9/26/2023	9:52	VCU
Broad Rock	DISCHARGE	0.043	9/26/2023	9:52	VCU
Broad Rock	TEMP_FIELD	16.6	10/10/2023	10:11	VCU
Broad Rock	PH_F	7.81	10/10/2023	10:11	VCU
Broad Rock	COND	201.0	10/10/2023	10:11	VCU
Broad Rock	DO_%	98.5	10/10/2023	10:11	VCU
Broad Rock	DO	9.61	10/10/2023	10:11	VCU
Broad Rock	TURB	0.78	10/10/2023	10:11	VCU
Broad Rock	TSS	0.29	10/10/2023	10:11	VCU
Broad Rock	ECOLI-MF	ND	10/10/2023	10:11	VCU
Broad Rock	DISCHARGE	0.017	10/10/2023	10:11	VCU
Broad Rock	TEMP_FIELD	13.7	10/24/2023	9:54	VCU
Broad Rock	PH_F	7.65	10/24/2023	9:54	VCU
Broad Rock	COND	189.8	10/24/2023	9:54	VCU

Broad Rock	DO_%	100.5	10/24/2023	9:54	VCU
Broad Rock	DO	10.41	10/24/2023	9:54	VCU
Broad Rock	TURB	0.59	10/24/2023	9:54	VCU
Broad Rock	TSS	1.00	10/24/2023	9:54	VCU
Broad Rock	ECOLI-MF	ND	10/24/2023	9:54	VCU
Broad Rock	DISCHARGE	0.018	10/24/2023	9:54	VCU
Broad Rock	TEMP_FIELD	15.4	11/7/2023	12:04	VCU
Broad Rock	PH_F	7.75	11/7/2023	12:04	VCU
Broad Rock	COND	222.1	11/7/2023	12:04	VCU
Broad Rock	DO_%	98.1	11/7/2023	12:04	VCU
Broad Rock	DO	9.81	11/7/2023	12:04	VCU
Broad Rock	TURB	0.89	11/7/2023	12:04	VCU
Broad Rock	TSS	7.97	11/7/2023	12:04	VCU
Broad Rock	ECOLI-MF	0	11/7/2023	12:04	VCU
Broad Rock	DISCHARGE	0.015	11/7/2023	12:04	VCU
Broad Rock	TEMP_FIELD	11.6	11/21/2023	9:42	VCU
Broad Rock	PH_F	7.62	11/21/2023	9:42	VCU
Broad Rock	COND	221.3	11/21/2023	9:42	VCU
Broad Rock	DO_%	96.2	11/21/2023	9:42	VCU
Broad Rock	DO	10.45	11/21/2023	9:42	VCU
Broad Rock	TURB	2.23	11/21/2023	9:42	VCU
Broad Rock	TSS	0.68	11/21/2023	9:42	VCU
Broad Rock	ECOLI-MF	0	11/21/2023	9:42	VCU
Broad Rock	DISCHARGE	0.035	11/21/2023	9:42	VCU
CSO#04	TEMP_FIELD	20.0	4/5/2023	13:50	VCU
CSO#04	PH_F	8.15	4/5/2023	13:50	VCU
CSO#04	COND	157.4	4/5/2023	13:50	VCU
CSO#04	DO_%	101.0	4/5/2023	13:50	VCU
CSO#04	DO	9.19	4/5/2023	13:50	VCU
CSO#04	TURB	5.12	4/5/2023	13:50	VCU
CSO#04	TSS	11.41	4/5/2023	13:50	VCU
CSO#04	ECOLI-MF	168	4/5/2023	13:50	VCU
CSO#04	TEMP_FIELD	16.2	4/11/2023	12:31	VCU
CSO#04	PH_F	8.15	4/11/2023	12:31	VCU
CSO#04	COND	138.9	4/11/2023	12:31	VCU
CSO#04	DO_%	106.1	4/11/2023	12:31	VCU
CSO#04	DO	10.43	4/11/2023	12:31	VCU
CSO#04	TURB	2.43	4/11/2023	12:31	VCU
CSO#04	TSS	3.14	4/11/2023	12:31	VCU
CSO#04	ECOLI-MF	ND	4/11/2023	12:31	VCU
CSO#04	TEMP_FIELD	20.1	4/18/2023	13:14	VCU
CSO#04	PH_F	8.28	4/18/2023	13:14	VCU
CSO#04	COND	149.9	4/18/2023	13:14	VCU
CSO#04	DO_%	104.5	4/18/2023	13:14	VCU
CSO#04	DO	9.48	4/18/2023	13:14	VCU
CSO#04	TURB	2.61	4/18/2023	13:14	VCU
CSO#04	TSS	3.49	4/18/2023	13:14	VCU
CSO#04	ECOLI-MF	5	4/18/2023	13:14	VCU
CSO#04	TEMP_FIELD	18.8	4/25/2023	12:37	VCU
CSO#04	PH_F	8.24	4/25/2023	12:37	VCU
CSO#04	COND	165.9	4/25/2023	12:37	VCU
CSO#04	DO_%	105.4	4/25/2023	12:37	VCU
CSO#04	DO	9.82	4/25/2023	12:37	VCU



CSO#04	TURB	3.45	4/25/2023	12:37	VCU
CSO#04	TSS	5.21	4/25/2023	12:37	VCU
CSO#04	ECOLI-MF	59	4/25/2023	12:37	VCU
CSO#04	TEMP_FIELD	16.0	5/2/2023	12:48	VCU
CSO#04	PH_F	7.35	5/2/2023	12:48	VCU
CSO#04	COND	126.2	5/2/2023	12:48	VCU
CSO#04	DO_%	97.3	5/2/2023	12:48	VCU
CSO#04	DO	9.60	5/2/2023	12:48	VCU
CSO#04	TURB	32.10	5/2/2023	12:48	VCU
CSO#04	TSS	67.10	5/2/2023	12:48	VCU
CSO#04	ECOLI-MF	84	5/2/2023	12:48	VCU
CSO#04	TEMP_FIELD	20.9	5/9/2023	12:37	VCU
CSO#04	PH_F	7.97	5/9/2023	12:37	VCU
CSO#04	COND	120.0	5/9/2023	12:37	VCU
CSO#04	DO_%	101.0	5/9/2023	12:37	VCU
CSO#04	DO	9.02	5/9/2023	12:37	VCU
CSO#04	TURB	6.46	5/9/2023	12:37	VCU
CSO#04	TSS	9.51	5/9/2023	12:37	VCU
CSO#04	ECOLI-MF	44	5/9/2023	12:37	VCU
CSO#04	TEMP_FIELD	22.1	5/16/2023	12:39	VCU
CSO#04	PH_F	7.94	5/16/2023	12:39	VCU
CSO#04	COND	129.8	5/16/2023	12:39	VCU
CSO#04	DO_%	103.2	5/16/2023	12:39	VCU
CSO#04	DO	9.00	5/16/2023	12:39	VCU
CSO#04	TURB	1.34	5/16/2023	12:39	VCU
CSO#04	TSS	4.44	5/16/2023	12:39	VCU
CSO#04	ECOLI-MF	78	5/16/2023	12:39	VCU
CSO#04	TEMP_FIELD	23.3	5/23/2023	12:42	VCU
CSO#04	PH_F	8.55	5/23/2023	12:42	VCU
CSO#04	COND	156.7	5/23/2023	12:42	VCU
CSO#04	DO_%	108.3	5/23/2023	12:42	VCU
CSO#04	DO	9.23	5/23/2023	12:42	VCU
CSO#04	TURB	4.66	5/23/2023	12:42	VCU
CSO#04	TSS	4.27	5/23/2023	12:42	VCU
CSO#04	ECOLI-MF	64	5/23/2023	12:42	VCU
CSO#04	TEMP_FIELD	20.6	5/30/2023	12:38	VCU
CSO#04	PH_F	7.69	5/30/2023	12:38	VCU
CSO#04	COND	176.1	5/30/2023	12:38	VCU
CSO#04	DO_%	99.4	5/30/2023	12:38	VCU
CSO#04	DO	8.92	5/30/2023	12:38	VCU
CSO#04	TURB	2.90	5/30/2023	12:38	VCU
CSO#04	TSS	2.79	5/30/2023	12:38	VCU
CSO#04	ECOLI-MF	48	5/30/2023	12:38	VCU
CSO#04	TEMP_FIELD	23.6	6/6/2023	11:47	VCU
CSO#04	PH_F	8.26	6/6/2023	11:47	VCU
CSO#04	COND	159.9	6/6/2023	11:47	VCU
CSO#04	DO_%	103.7	6/6/2023	11:47	VCU
CSO#04	DO	8.80	6/6/2023	11:47	VCU
CSO#04	TURB	1.24	6/6/2023	11:47	VCU
CSO#04	TSS	2.42	6/6/2023	11:47	VCU
CSO#04	ECOLI-MF	45	6/6/2023	11:47	VCU
CSO#04	TEMP_FIELD	24.8	6/13/2023	11:36	VCU
CSO#04	PH_F	8.24	6/13/2023	11:36	VCU

CSO#04	COND	200.9	6/13/2023	11:36	VCU
CSO#04	DO_%	103.5	6/13/2023	11:36	VCU
CSO#04	DO	8.58	6/13/2023	11:36	VCU
CSO#04	TURB	1.56	6/13/2023	11:36	VCU
CSO#04	TSS	1.23	6/13/2023	11:36	VCU
CSO#04	ECOLI-MF	41	6/13/2023	11:36	VCU
CSO#04	TEMP_FIELD	26.1	6/19/2023	12:30	VCU
CSO#04	PH_F	8.59	6/19/2023	12:30	VCU
CSO#04	COND	218.2	6/19/2023	12:30	VCU
CSO#04	DO_%	105.5	6/19/2023	12:30	VCU
CSO#04	DO	8.53	6/19/2023	12:30	VCU
CSO#04	TURB	1.29	6/19/2023	12:30	VCU
CSO#04	TSS	3.09	6/19/2023	12:30	VCU
CSO#04	ECOLI-MF	69	6/19/2023	12:30	VCU
CSO#04	TEMP_FIELD	25.7	6/27/2023	11:33	VCU
CSO#04	PH_F	8.16	6/27/2023	11:33	VCU
CSO#04	COND	157.4	6/27/2023	11:33	VCU
CSO#04	DO_%	100.2	6/27/2023	11:33	VCU
CSO#04	DO	8.17	6/27/2023	11:33	VCU
CSO#04	TURB	5.21	6/27/2023	11:33	VCU
CSO#04	TSS	6.67	6/27/2023	11:33	VCU
CSO#04	ECOLI-MF	272	6/27/2023	11:33	VCU
CSO#04	TEMP_FIELD	28.6	7/5/2023	12:14	VCU
CSO#04	PH_F	8.11	7/5/2023	12:14	VCU
CSO#04	COND	96.5	7/5/2023	12:14	VCU
CSO#04	DO_%	103.3	7/5/2023	12:14	VCU
CSO#04	DO	8.00	7/5/2023	12:14	VCU
CSO#04	TURB	12.50	7/5/2023	12:14	VCU
CSO#04	TSS	10.23	7/5/2023	12:14	VCU
CSO#04	ECOLI-MF	93	7/5/2023	12:14	VCU
CSO#04	TEMP_FIELD	28.6	7/11/2023	12:26	VCU
CSO#04	PH_F	8.51	7/11/2023	12:26	VCU
CSO#04	COND	137.7	7/11/2023	12:26	VCU
CSO#04	DO_%	104.1	7/11/2023	12:26	VCU
CSO#04	DO	8.05	7/11/2023	12:26	VCU
CSO#04	TURB	11.40	7/11/2023	12:26	VCU
CSO#04	TSS	14.88	7/11/2023	12:26	VCU
CSO#04	ECOLI-MF	353	7/11/2023	12:26	VCU
CSO#04	TEMP_FIELD	25.4	7/18/2023	11:30	VCU
CSO#04	PH_F	7.41	7/18/2023	11:30	VCU
CSO#04	COND	74.4	7/18/2023	11:30	VCU
CSO#04	DO_%	101.2	7/18/2023	11:30	VCU
CSO#04	DO	8.29	7/18/2023	11:30	VCU
CSO#04	TURB	165.00	7/18/2023	11:30	VCU
CSO#04	TSS	157.27	7/18/2023	11:30	VCU
CSO#04	ECOLI-MF	940	7/18/2023	11:30	VCU
CSO#04	TEMP_FIELD	28.5	7/25/2023	12:03	VCU
CSO#04	PH_F	8.38	7/25/2023	12:03	VCU
CSO#04	COND	125.2	7/25/2023	12:03	VCU
CSO#04	DO_%	107.1	7/25/2023	12:03	VCU
CSO#04	DO	8.38	7/25/2023	12:03	VCU
CSO#04	TURB	12.10	7/25/2023	12:03	VCU
CSO#04	TSS	5.39	7/25/2023	12:03	VCU

CSO#04	ECOLI-MF	319	7/25/2023	12:03	VCU
CSO#04	TEMP_FIELD	27.8	8/1/2023	10:15	VCU
CSO#04	PH_F	8.20	8/1/2023	10:15	VCU
CSO#04	COND	146.4	8/1/2023	10:15	VCU
CSO#04	DO_%	101.2	8/1/2023	10:15	VCU
CSO#04	DO	7.95	8/1/2023	10:15	VCU
CSO#04	TURB	1.87	8/1/2023	10:15	VCU
CSO#04	TSS	3.11	8/1/2023	10:15	VCU
CSO#04	ECOLI-MF	126	8/1/2023	10:15	VCU
CSO#04	TEMP_FIELD	27.6	8/8/2023	12:20	VCU
CSO#04	PH_F	8.32	8/8/2023	12:20	VCU
CSO#04	COND	149.6	8/8/2023	12:20	VCU
CSO#04	DO_%	104.1	8/8/2023	12:20	VCU
CSO#04	DO	8.20	8/8/2023	12:20	VCU
CSO#04	TURB	2.17	8/8/2023	12:20	VCU
CSO#04	TSS	4.62	8/8/2023	12:20	VCU
CSO#04	ECOLI-MF	203	8/8/2023	12:20	VCU
CSO#04	TEMP_FIELD	29.9	8/15/2023	11:26	VCU
CSO#04	PH_F	8.43	8/15/2023	11:26	VCU
CSO#04	COND	178.7	8/15/2023	11:26	VCU
CSO#04	DO_%	104.8	8/15/2023	11:26	VCU
CSO#04	DO	7.93	8/15/2023	11:26	VCU
CSO#04	TURB	2.65	8/15/2023	11:26	VCU
CSO#04	TSS	3.04	8/15/2023	11:26	VCU
CSO#04	ECOLI-MF	138	8/15/2023	11:26	VCU
CSO#04	TEMP_FIELD	25.8	8/23/2023	10:41	VCU
CSO#04	PH_F	8.54	8/23/2023	10:41	VCU
CSO#04	COND	222.9	8/23/2023	10:41	VCU
CSO#04	DO_%	98.8	8/23/2023	10:41	VCU
CSO#04	DO	8.04	8/23/2023	10:41	VCU
CSO#04	TURB	2.68	8/23/2023	10:41	VCU
CSO#04	TSS	2.81	8/23/2023	10:41	VCU
CSO#04	ECOLI-MF	174	8/23/2023	10:41	VCU
CSO#04	TEMP_FIELD	27.2	8/30/2023	12:22	VCU
CSO#04	PH_F	8.29	8/30/2023	12:22	VCU
CSO#04	COND	207.1	8/30/2023	12:22	VCU
CSO#04	DO_%	102.9	8/30/2023	12:22	VCU
CSO#04	DO	8.16	8/30/2023	12:22	VCU
CSO#04	TURB	11.30	8/30/2023	12:22	VCU
CSO#04	TSS	23.83	8/30/2023	12:22	VCU
CSO#04	ECOLI-MF	668	8/30/2023	12:22	VCU
CSO#04	TEMP_FIELD	28.6	9/6/2023	12:32	VCU
CSO#04	PH_F	8.74	9/6/2023	12:32	VCU
CSO#04	COND	189.9	9/6/2023	12:32	VCU
CSO#04	DO_%	104.8	9/6/2023	12:32	VCU
CSO#04	DO	8.12	9/6/2023	12:32	VCU
CSO#04	TURB	4.31	9/6/2023	12:32	VCU
CSO#04	TSS	3.31	9/6/2023	12:32	VCU
CSO#04	ECOLI-MF	166	9/6/2023	12:32	VCU
CSO#04	TEMP_FIELD	28.0	9/13/2023	13:21	VCU
CSO#04	PH_F	8.59	9/13/2023	13:21	VCU
CSO#04	COND	258.6	9/13/2023	13:21	VCU
CSO#04	DO_%	108.9	9/13/2023	13:21	VCU

CSO#04	DO	8.52	9/13/2023	13:21	VCU
CSO#04	TURB	1.97	9/13/2023	13:21	VCU
CSO#04	TSS	2.76	9/13/2023	13:21	VCU
CSO#04	ECOLI-MF	157	9/13/2023	13:21	VCU
CSO#04	TEMP_FIELD	22.7	9/20/2023	7:28	VCU
CSO#04	PH_F	8.05	9/20/2023	7:28	VCU
CSO#04	COND	239.8	9/20/2023	7:28	VCU
CSO#04	DO_%	95.7	9/20/2023	7:28	VCU
CSO#04	DO	8.25	9/20/2023	7:28	VCU
CSO#04	TURB	2.15	9/20/2023	7:28	VCU
CSO#04	TSS	4.09	9/20/2023	7:28	VCU
CSO#04	ECOLI-MF	73	9/20/2023	7:28	VCU
CSO#04	TEMP_FIELD	19.5	9/27/2023	13:08	VCU
CSO#04	PH_F	7.89	9/27/2023	13:08	VCU
CSO#04	COND	173.1	9/27/2023	13:08	VCU
CSO#04	DO_%	102.3	9/27/2023	13:08	VCU
CSO#04	DO	9.41	9/27/2023	13:08	VCU
CSO#04	TURB	7.58	9/27/2023	13:08	VCU
CSO#04	TSS	5.09	9/27/2023	13:08	VCU
CSO#04	ECOLI-MF	158	9/27/2023	13:08	VCU
CSO#04	TEMP_FIELD	21.7	10/4/2023	10:38	VCU
CSO#04	PH_F	8.00	10/4/2023	10:38	VCU
CSO#04	COND	233.9	10/4/2023	10:38	VCU
CSO#04	DO_%	97.9	10/4/2023	10:38	VCU
CSO#04	DO	8.61	10/4/2023	10:38	VCU
CSO#04	TURB	2.32	10/4/2023	10:38	VCU
CSO#04	TSS	2.03	10/4/2023	10:38	VCU
CSO#04	ECOLI-MF	92	10/4/2023	10:38	VCU
CSO#04	TEMP_FIELD	19.1	10/11/2023	12:24	VCU
CSO#04	PH_F	8.28	10/11/2023	12:24	VCU
CSO#04	COND	283.2	10/11/2023	12:24	VCU
CSO#04	DO_%	105.0	10/11/2023	12:24	VCU
CSO#04	DO	9.71	10/11/2023	12:24	VCU
CSO#04	TURB	1.23	10/11/2023	12:24	VCU
CSO#04	TSS	0.70	10/11/2023	12:24	VCU
CSO#04	ECOLI-MF	63	10/11/2023	12:24	VCU
CSO#04	TEMP_FIELD	16.5	10/18/2023	11:14	VCU
CSO#04	PH_F	8.18	10/18/2023	11:14	VCU
CSO#04	COND	266.5	10/18/2023	11:14	VCU
CSO#04	DO_%	101.4	10/18/2023	11:14	VCU
CSO#04	DO	9.89	10/18/2023	11:14	VCU
CSO#04	TURB	1.11	10/18/2023	11:14	VCU
CSO#04	TSS	1.05	10/18/2023	11:14	VCU
CSO#04	ECOLI-MF	68	10/18/2023	11:14	VCU
CSO#04	TEMP_FIELD	15.5	10/25/2023	12:20	VCU
CSO#04	PH_F	8.36	10/25/2023	12:20	VCU
CSO#04	COND	270.4	10/25/2023	12:20	VCU
CSO#04	DO_%	104.4	10/25/2023	12:20	VCU
CSO#04	DO	10.41	10/25/2023	12:20	VCU
CSO#04	TURB	1.13	10/25/2023	12:20	VCU
CSO#04	TSS	1.41	10/25/2023	12:20	VCU
CSO#04	ECOLI-MF	63	10/25/2023	12:20	VCU
CSO#04	TEMP_FIELD	14.5	11/1/2023	11:22	VCU

CSO#04	PH_F	8.90	11/1/2023	11:22	VCU
CSO#04	COND	272.2	11/1/2023	11:22	VCU
CSO#04	DO_%	100.1	11/1/2023	11:22	VCU
CSO#04	DO	10.19	11/1/2023	11:22	VCU
CSO#04	TURB	2.07	11/1/2023	11:22	VCU
CSO#04	TSS	0.99	11/1/2023	11:22	VCU
CSO#04	ECOLI-MF	72	11/1/2023	11:22	VCU
CSO#04	TEMP_FIELD	15.2	11/8/2023	15:04	VCU
CSO#04	PH_F	8.32	11/8/2023	15:04	VCU
CSO#04	COND	289.4	11/8/2023	15:04	VCU
CSO#04	DO_%	107.8	11/8/2023	15:04	VCU
CSO#04	DO	10.81	11/8/2023	15:04	VCU
CSO#04	TURB	1.07	11/8/2023	15:04	VCU
CSO#04	TSS	0.86	11/8/2023	15:04	VCU
CSO#04	ECOLI-MF	39	11/8/2023	15:04	VCU
CSO#04	TEMP_FIELD	11.2	11/15/2023	11:48	VCU
CSO#04	PH_F	8.15	11/15/2023	11:48	VCU
CSO#04	COND	294.9	11/15/2023	11:48	VCU
CSO#04	DO_%	104.2	11/15/2023	11:48	VCU
CSO#04	DO	11.42	11/15/2023	11:48	VCU
CSO#04	TURB	1.24	11/15/2023	11:48	VCU
CSO#04	TSS	0.71	11/15/2023	11:48	VCU
CSO#04	ECOLI-MF	38	11/15/2023	11:48	VCU
CSO#04	TEMP_FIELD	10.3	11/20/2023	11:57	VCU
CSO#04	PH_F	8.14	11/20/2023	11:57	VCU
CSO#04	COND	262.5	11/20/2023	11:57	VCU
CSO#04	DO_%	103.5	11/20/2023	11:57	VCU
CSO#04	DO	11.60	11/20/2023	11:57	VCU
CSO#04	TURB	1.58	11/20/2023	11:57	VCU
CSO#04	TSS	1.09	11/20/2023	11:57	VCU
CSO#04	ECOLI-MF	33	11/20/2023	11:57	VCU
CSO#04	TEMP_FIELD	6.1	11/29/2023	11:46	VCU
CSO#04	PH_F	8.04	11/29/2023	11:46	VCU
CSO#04	COND	214.5	11/29/2023	11:46	VCU
CSO#04	DO_%	103.6	11/29/2023	11:46	VCU
CSO#04	DO	12.85	11/29/2023	11:46	VCU
CSO#04	TURB	3.97	11/29/2023	11:46	VCU
CSO#04	TSS	3.43	11/29/2023	11:46	VCU
CSO#04	ECOLI-MF	69	11/29/2023	11:46	VCU
Gillies	TEMP_FIELD	16.7	4/13/2023	12:00	VCU
Gillies	PH_F	7.22	4/13/2023	12:00	VCU
Gillies	COND	161.0	4/13/2023	12:00	VCU
Gillies	DO_%	98.3	4/13/2023	12:00	VCU
Gillies	DO	9.58	4/13/2023	12:00	VCU
Gillies	TURB	1.97	4/13/2023	12:00	VCU
Gillies	TSS	2.08	4/13/2023	12:00	VCU
Gillies	ECOLI-MF	ND	4/13/2023	12:00	VCU
Gillies	DISCHARGE	0.070	4/13/2023	12:00	VCU
Gillies	TEMP_FIELD	14.4	4/27/2023	12:13	VCU
Gillies	PH_F	7.14	4/27/2023	12:13	VCU
Gillies	COND	153.2	4/27/2023	12:13	VCU
Gillies	DO_%	94.5	4/27/2023	12:13	VCU
Gillies	DO	9.65	4/27/2023	12:13	VCU

Gillies	TURB	3.15	4/27/2023	12:13	VCU
Gillies	TSS	1.72	4/27/2023	12:13	VCU
Gillies	ECOLI-MF	11	4/27/2023	12:13	VCU
Gillies	DISCHARGE	0.063	4/27/2023	12:13	VCU
Gillies	TEMP_FIELD	16.5	5/11/2023	11:18	VCU
Gillies	PH_F	7.08	5/11/2023	11:18	VCU
Gillies	COND	154.1	5/11/2023	11:18	VCU
Gillies	DO_%	93.4	5/11/2023	11:18	VCU
Gillies	DO	9.12	5/11/2023	11:18	VCU
Gillies	TURB	1.92	5/11/2023	11:18	VCU
Gillies	TSS	1.45	5/11/2023	11:18	VCU
Gillies	ECOLI-MF	44	5/11/2023	11:18	VCU
Gillies	DISCHARGE	0.072	5/11/2023	11:18	VCU
Gillies	TEMP_FIELD	17.0	5/25/2023	11:14	VCU
Gillies	PH_F	7.04	5/25/2023	11:14	VCU
Gillies	COND	152.1	5/25/2023	11:14	VCU
Gillies	DO_%	90.0	5/25/2023	11:14	VCU
Gillies	DO	8.69	5/25/2023	11:14	VCU
Gillies	TURB	4.16	5/25/2023	11:14	VCU
Gillies	TSS	1.87	5/25/2023	11:14	VCU
Gillies	ECOLI-MF	64	5/25/2023	11:14	VCU
Gillies	DISCHARGE	0.081	5/25/2023	11:14	VCU
Gillies	TEMP_FIELD	19.3	6/8/2023	11:31	VCU
Gillies	PH_F	7.17	6/8/2023	11:31	VCU
Gillies	COND	135.8	6/8/2023	11:31	VCU
Gillies	DO_%	89.7	6/8/2023	11:31	VCU
Gillies	DO	8.26	6/8/2023	11:31	VCU
Gillies	TURB	1.69	6/8/2023	11:31	VCU
Gillies	TSS	15.77	6/8/2023	11:31	VCU
Gillies	ECOLI-MF	53	6/8/2023	11:31	VCU
Gillies	DISCHARGE	0.130	6/8/2023	11:31	VCU
Gillies	TEMP_FIELD	21.1	6/22/2023	12:50	VCU
Gillies	PH_F	7.25	6/22/2023	12:50	VCU
Gillies	COND	173.3	6/22/2023	12:50	VCU
Gillies	DO_%	88.9	6/22/2023	12:50	VCU
Gillies	DO	7.91	6/22/2023	12:50	VCU
Gillies	TURB	2.35	6/22/2023	12:50	VCU
Gillies	TSS	0.55	6/22/2023	12:50	VCU
Gillies	ECOLI-MF	93	6/22/2023	12:50	VCU
Gillies	DISCHARGE	0.052	6/22/2023	12:50	VCU
Gillies	TEMP_FIELD	24.8	7/6/2023	11:25	VCU
Gillies	PH_F	7.19	7/6/2023	11:25	VCU
Gillies	COND	162.7	7/6/2023	11:25	VCU
Gillies	DO_%	92.3	7/6/2023	11:25	VCU
Gillies	DO	7.65	7/6/2023	11:25	VCU
Gillies	TURB	1.48	7/6/2023	11:25	VCU
Gillies	TSS	0.78	7/6/2023	11:25	VCU
Gillies	ECOLI-MF	102	7/6/2023	11:25	VCU
Gillies	DISCHARGE	0.067	7/6/2023	11:25	VCU
Gillies	TEMP_FIELD	24.4	7/20/2023	11:05	VCU
Gillies	PH_F	7.10	7/20/2023	11:05	VCU
Gillies	COND	158.0	7/20/2023	11:05	VCU
Gillies	DO_%	86.8	7/20/2023	11:05	VCU

Gillies	DO	7.25	7/20/2023	11:05	VCU
Gillies	TURB	3.39	7/20/2023	11:05	VCU
Gillies	TSS	1.47	7/20/2023	11:05	VCU
Gillies	ECOLI-MF	200	7/20/2023	11:05	VCU
Gillies	DISCHARGE	0.091	7/20/2023	11:05	VCU
Gillies	TEMP_FIELD	21.4	8/3/2023	10:18	VCU
Gillies	PH_F	7.24	8/3/2023	10:18	VCU
Gillies	COND	167.5	8/3/2023	10:18	VCU
Gillies	DO_%	100.1	8/3/2023	10:18	VCU
Gillies	DO	8.85	8/3/2023	10:18	VCU
Gillies	TURB	1.71	8/3/2023	10:18	VCU
Gillies	TSS	0.43	8/3/2023	10:18	VCU
Gillies	ECOLI-MF	74	8/3/2023	10:18	VCU
Gillies	DISCHARGE	0.055	8/3/2023	10:18	VCU
Gillies	TEMP_FIELD	24.1	8/17/2023	11:02	VCU
Gillies	PH_F	7.18	8/17/2023	11:02	VCU
Gillies	COND	161.1	8/17/2023	11:02	VCU
Gillies	DO_%	94.8	8/17/2023	11:02	VCU
Gillies	DO	7.96	8/17/2023	11:02	VCU
Gillies	TURB	2.19	8/17/2023	11:02	VCU
Gillies	TSS	0.31	8/17/2023	11:02	VCU
Gillies	ECOLI-MF	105	8/17/2023	11:02	VCU
Gillies	DISCHARGE	0.034	8/17/2023	11:02	VCU
Gillies	TEMP_FIELD	23.4	8/29/2023	10:41	VCU
Gillies	PH_F	7.13	8/29/2023	10:41	VCU
Gillies	COND	161.3	8/29/2023	10:41	VCU
Gillies	DO_%	87.3	8/29/2023	10:41	VCU
Gillies	DO	7.43	8/29/2023	10:41	VCU
Gillies	TURB	3.33	8/29/2023	10:41	VCU
Gillies	TSS	1.28	8/29/2023	10:41	VCU
Gillies	ECOLI-MF	12	8/29/2023	10:41	VCU
Gillies	DISCHARGE	0.093	8/29/2023	10:41	VCU
Gillies	TEMP_FIELD	22.7	9/12/2023	10:44	VCU
Gillies	PH_F	7.06	9/12/2023	10:44	VCU
Gillies	COND	170.1	9/12/2023	10:44	VCU
Gillies	DO_%	82.4	9/12/2023	10:44	VCU
Gillies	DO	7.10	9/12/2023	10:44	VCU
Gillies	TURB	1.67	9/12/2023	10:44	VCU
Gillies	TSS	1.00	9/12/2023	10:44	VCU
Gillies	ECOLI-MF	92	9/12/2023	10:44	VCU
Gillies	DISCHARGE	0.041	9/12/2023	10:44	VCU
Gillies	TEMP_FIELD	19.3	9/26/2023	10:35	VCU
Gillies	PH_F	7.07	9/26/2023	10:35	VCU
Gillies	COND	137.4	9/26/2023	10:35	VCU
Gillies	DO_%	88.5	9/26/2023	10:35	VCU
Gillies	DO	8.16	9/26/2023	10:35	VCU
Gillies	TURB	3.66	9/26/2023	10:35	VCU
Gillies	TSS	2.34	9/26/2023	10:35	VCU
Gillies	ECOLI-MF	79	9/26/2023	10:35	VCU
Gillies	DISCHARGE	0.120	9/26/2023	10:35	VCU
Gillies	TEMP_FIELD	14.3	10/10/2023	10:51	VCU
Gillies	PH_F	7.10	10/10/2023	10:51	VCU
Gillies	COND	173.2	10/10/2023	10:51	VCU

Gillies	DO_%	91.4	10/10/2023	10:51	VCU
Gillies	DO	9.35	10/10/2023	10:51	VCU
Gillies	TURB	1.19	10/10/2023	10:51	VCU
Gillies	TSS	0.06	10/10/2023	10:51	VCU
Gillies	ECOLI-MF	46	10/10/2023	10:51	VCU
Gillies	DISCHARGE	0.048	10/10/2023	10:51	VCU
Gillies	TEMP_FIELD	11.3	10/24/2023	10:33	VCU
Gillies	PH_F	6.93	10/24/2023	10:33	VCU
Gillies	COND	145.2	10/24/2023	10:33	VCU
Gillies	DO_%	90.9	10/24/2023	10:33	VCU
Gillies	DO	9.97	10/24/2023	10:33	VCU
Gillies	TURB	1.19	10/24/2023	10:33	VCU
Gillies	TSS	1.04	10/24/2023	10:33	VCU
Gillies	ECOLI-MF	110	10/24/2023	10:33	VCU
Gillies	DISCHARGE	0.047	10/24/2023	10:33	VCU
Gillies	TEMP_FIELD	12.5	11/7/2023	11:43	VCU
Gillies	PH_F	7.02	11/7/2023	11:43	VCU
Gillies	COND	196.4	11/7/2023	11:43	VCU
Gillies	DO_%	94.8	11/7/2023	11:43	VCU
Gillies	DO	10.09	11/7/2023	11:43	VCU
Gillies	TURB	1.11	11/7/2023	11:43	VCU
Gillies	TSS	0.27	11/7/2023	11:43	VCU
Gillies	ECOLI-MF	25	11/7/2023	11:43	VCU
Gillies	DISCHARGE	0.025	11/7/2023	11:43	VCU
Gillies	TEMP_FIELD	9.1	11/21/2023	10:29	VCU
Gillies	PH_F	7.24	11/21/2023	10:29	VCU
Gillies	COND	215.7	11/21/2023	10:29	VCU
Gillies	DO_%	88.8	11/21/2023	10:29	VCU
Gillies	DO	10.27	11/21/2023	10:29	VCU
Gillies	TURB	0.82	11/21/2023	10:29	VCU
Gillies	TSS	0.50	11/21/2023	10:29	VCU
Gillies	ECOLI-MF	78	11/21/2023	10:29	VCU
Gillies	DISCHARGE	0.054	11/21/2023	10:29	VCU
Huguenot	TEMP_FIELD	18.9	4/5/2023	14:42	VCU
Huguenot	PH_F	7.99	4/5/2023	14:42	VCU
Huguenot	COND	166.3	4/5/2023	14:42	VCU
Huguenot	DO_%	110.2	4/5/2023	14:42	VCU
Huguenot	DO	10.22	4/5/2023	14:42	VCU
Huguenot	TURB	4.50	4/5/2023	14:42	VCU
Huguenot	TSS	5.21	4/5/2023	14:42	VCU
Huguenot	ECOLI-MF	5	4/5/2023	14:42	VCU
Huguenot	TEMP_FIELD	15.9	4/11/2023	13:12	VCU
Huguenot	PH_F	7.93	4/11/2023	13:12	VCU
Huguenot	COND	140.1	4/11/2023	13:12	VCU
Huguenot	DO_%	110.1	4/11/2023	13:12	VCU
Huguenot	DO	10.88	4/11/2023	13:12	VCU
Huguenot	TURB	3.05	4/11/2023	13:12	VCU
Huguenot	TSS	2.98	4/11/2023	13:12	VCU
Huguenot	ECOLI-MF	ND	4/11/2023	13:12	VCU
Huguenot	TEMP_FIELD	20.0	4/18/2023	14:05	VCU
Huguenot	PH_F	7.98	4/18/2023	14:05	VCU
Huguenot	COND	153.9	4/18/2023	14:05	VCU
Huguenot	DO_%	106.1	4/18/2023	14:05	VCU



Huguenot	DO	9.65	4/18/2023	14:05	VCU
Huguenot	TURB	1.71	4/18/2023	14:05	VCU
Huguenot	TSS	2.91	4/18/2023	14:05	VCU
Huguenot	ECOLI-MF	2	4/18/2023	14:05	VCU
Huguenot	TEMP_FIELD	19.2	4/25/2023	13:17	VCU
Huguenot	PH_F	7.99	4/25/2023	13:17	VCU
Huguenot	COND	168.5	4/25/2023	13:17	VCU
Huguenot	DO_%	106.0	4/25/2023	13:17	VCU
Huguenot	DO	9.80	4/25/2023	13:17	VCU
Huguenot	TURB	2.16	4/25/2023	13:17	VCU
Huguenot	TSS	2.73	4/25/2023	13:17	VCU
Huguenot	ECOLI-MF	3	4/25/2023	13:17	VCU
Huguenot	TEMP_FIELD	15.6	5/2/2023	13:41	VCU
Huguenot	PH_F	7.23	5/2/2023	13:41	VCU
Huguenot	COND	130.4	5/2/2023	13:41	VCU
Huguenot	DO_%	100.8	5/2/2023	13:41	VCU
Huguenot	DO	10.04	5/2/2023	13:41	VCU
Huguenot	TURB	47.10	5/2/2023	13:41	VCU
Huguenot	TSS	62.00	5/2/2023	13:41	VCU
Huguenot	ECOLI-MF	164	5/2/2023	13:41	VCU
Huguenot	TEMP_FIELD	20.8	5/9/2023	13:10	VCU
Huguenot	PH_F	7.67	5/9/2023	13:10	VCU
Huguenot	COND	121.8	5/9/2023	13:10	VCU
Huguenot	DO_%	103.0	5/9/2023	13:10	VCU
Huguenot	DO	9.21	5/9/2023	13:10	VCU
Huguenot	TURB	2.66	5/9/2023	13:10	VCU
Huguenot	TSS	8.46	5/9/2023	13:10	VCU
Huguenot	ECOLI-MF	15	5/9/2023	13:10	VCU
Huguenot	TEMP_FIELD	21.9	5/16/2023	13:33	VCU
Huguenot	PH_F	7.70	5/16/2023	13:33	VCU
Huguenot	COND	128.4	5/16/2023	13:33	VCU
Huguenot	DO_%	101.6	5/16/2023	13:33	VCU
Huguenot	DO	8.89	5/16/2023	13:33	VCU
Huguenot	TURB	2.97	5/16/2023	13:33	VCU
Huguenot	TSS	4.33	5/16/2023	13:33	VCU
Huguenot	ECOLI-MF	21	5/16/2023	13:33	VCU
Huguenot	TEMP_FIELD	24.1	5/23/2023	13:23	VCU
Huguenot	PH_F	8.22	5/23/2023	13:23	VCU
Huguenot	COND	162.5	5/23/2023	13:23	VCU
Huguenot	DO_%	107.0	5/23/2023	13:23	VCU
Huguenot	DO	8.99	5/23/2023	13:23	VCU
Huguenot	TURB	4.66	5/23/2023	13:23	VCU
Huguenot	TSS	6.01	5/23/2023	13:23	VCU
Huguenot	ECOLI-MF	18	5/23/2023	13:23	VCU
Huguenot	TEMP_FIELD	20.9	5/30/2023	13:30	VCU
Huguenot	PH_F	7.95	5/30/2023	13:30	VCU
Huguenot	COND	177.0	5/30/2023	13:30	VCU
Huguenot	DO_%	99.2	5/30/2023	13:30	VCU
Huguenot	DO	8.85	5/30/2023	13:30	VCU
Huguenot	TURB	5.49	5/30/2023	13:30	VCU
Huguenot	TSS	3.29	5/30/2023	13:30	VCU
Huguenot	ECOLI-MF	47	5/30/2023	13:30	VCU
Huguenot	TEMP_FIELD	24.3	6/6/2023	12:26	VCU

Huguenot	PH_F	8.29	6/6/2023	12:26	VCU
Huguenot	COND	166.5	6/6/2023	12:26	VCU
Huguenot	DO_%	108.3	6/6/2023	12:26	VCU
Huguenot	DO	9.07	6/6/2023	12:26	VCU
Huguenot	TURB	0.79	6/6/2023	12:26	VCU
Huguenot	TSS	1.57	6/6/2023	12:26	VCU
Huguenot	ECOLI-MF	6	6/6/2023	12:26	VCU
Huguenot	TEMP_FIELD	25.9	6/13/2023	12:28	VCU
Huguenot	PH_F	8.48	6/13/2023	12:28	VCU
Huguenot	COND	200.0	6/13/2023	12:28	VCU
Huguenot	DO_%	108.9	6/13/2023	12:28	VCU
Huguenot	DO	8.85	6/13/2023	12:28	VCU
Huguenot	TURB	0.74	6/13/2023	12:28	VCU
Huguenot	TSS	0.96	6/13/2023	12:28	VCU
Huguenot	ECOLI-MF	11	6/13/2023	12:28	VCU
Huguenot	TEMP_FIELD	26.4	6/19/2023	13:02	VCU
Huguenot	PH_F	8.43	6/19/2023	13:02	VCU
Huguenot	COND	214.0	6/19/2023	13:02	VCU
Huguenot	DO_%	104.4	6/19/2023	13:02	VCU
Huguenot	DO	8.41	6/19/2023	13:02	VCU
Huguenot	TURB	0.91	6/19/2023	13:02	VCU
Huguenot	TSS	1.61	6/19/2023	13:02	VCU
Huguenot	ECOLI-MF	2	6/19/2023	13:02	VCU
Huguenot	TEMP_FIELD	25.8	6/27/2023	12:00	VCU
Huguenot	PH_F	8.21	6/27/2023	12:00	VCU
Huguenot	COND	176.0	6/27/2023	12:00	VCU
Huguenot	DO_%	101.2	6/27/2023	12:00	VCU
Huguenot	DO	8.24	6/27/2023	12:00	VCU
Huguenot	TURB	3.34	6/27/2023	12:00	VCU
Huguenot	TSS	6.17	6/27/2023	12:00	VCU
Huguenot	ECOLI-MF	61	6/27/2023	12:00	VCU
Huguenot	TEMP_FIELD	29.0	7/5/2023	12:55	VCU
Huguenot	PH_F	7.60	7/5/2023	12:55	VCU
Huguenot	COND	94.8	7/5/2023	12:55	VCU
Huguenot	DO_%	99.3	7/5/2023	12:55	VCU
Huguenot	DO	7.63	7/5/2023	12:55	VCU
Huguenot	TURB	12.70	7/5/2023	12:55	VCU
Huguenot	TSS	26.91	7/5/2023	12:55	VCU
Huguenot	ECOLI-MF	31	7/5/2023	12:55	VCU
Huguenot	TEMP_FIELD	27.9	7/11/2023	11:12	VCU
Huguenot	PH_F	7.92	7/11/2023	11:12	VCU
Huguenot	COND	121.5	7/11/2023	11:12	VCU
Huguenot	DO_%	103.8	7/11/2023	11:12	VCU
Huguenot	DO	8.14	7/11/2023	11:12	VCU
Huguenot	TURB	11.00	7/11/2023	11:12	VCU
Huguenot	TSS	12.29	7/11/2023	11:12	VCU
Huguenot	ECOLI-MF	34	7/11/2023	11:12	VCU
Huguenot	TEMP_FIELD	25.1	7/18/2023	12:13	VCU
Huguenot	PH_F	7.03	7/18/2023	12:13	VCU
Huguenot	COND	74.9	7/18/2023	12:13	VCU
Huguenot	DO_%	94.2	7/18/2023	12:13	VCU
Huguenot	DO	7.77	7/18/2023	12:13	VCU
Huguenot	TURB	136.00	7/18/2023	12:13	VCU

Huguenot	TSS	96.00	7/18/2023	12:13	VCU
Huguenot	ECOLI-MF	523	7/18/2023	12:13	VCU
Huguenot	TEMP_FIELD	29.1	7/25/2023	12:40	VCU
Huguenot	PH_F	8.19	7/25/2023	12:40	VCU
Huguenot	COND	130.5	7/25/2023	12:40	VCU
Huguenot	DO_%	110.2	7/25/2023	12:40	VCU
Huguenot	DO	8.45	7/25/2023	12:40	VCU
Huguenot	TURB	3.71	7/25/2023	12:40	VCU
Huguenot	TSS	4.75	7/25/2023	12:40	VCU
Huguenot	ECOLI-MF	30	7/25/2023	12:40	VCU
Huguenot	TEMP_FIELD	ND	8/1/2023	ND	VCU
Huguenot	PH_F	ND	8/1/2023	ND	VCU
Huguenot	COND	ND	8/1/2023	ND	VCU
Huguenot	DO_%	ND	8/1/2023	ND	VCU
Huguenot	DO	ND	8/1/2023	ND	VCU
Huguenot	TURB	2.91	8/1/2023	ND	VCU
Huguenot	TSS	2.53	8/1/2023	ND	VCU
Huguenot	ECOLI-MF	17	8/1/2023	ND	VCU
Huguenot	TEMP_FIELD	28.1	8/8/2023	13:01	VCU
Huguenot	PH_F	8.14	8/8/2023	13:01	VCU
Huguenot	COND	152.7	8/8/2023	13:01	VCU
Huguenot	DO_%	107.1	8/8/2023	13:01	VCU
Huguenot	DO	8.36	8/8/2023	13:01	VCU
Huguenot	TURB	1.10	8/8/2023	13:01	VCU
Huguenot	TSS	3.15	8/8/2023	13:01	VCU
Huguenot	ECOLI-MF	12	8/8/2023	13:01	VCU
Huguenot	TEMP_FIELD	30.6	8/15/2023	12:00	VCU
Huguenot	PH_F	8.59	8/15/2023	12:00	VCU
Huguenot	COND	183.6	8/15/2023	12:00	VCU
Huguenot	DO_%	109.6	8/15/2023	12:00	VCU
Huguenot	DO	8.19	8/15/2023	12:00	VCU
Huguenot	TURB	2.19	8/15/2023	12:00	VCU
Huguenot	TSS	2.22	8/15/2023	12:00	VCU
Huguenot	ECOLI-MF	25	8/15/2023	12:00	VCU
Huguenot	TEMP_FIELD	27.3	8/23/2023	11:35	VCU
Huguenot	PH_F	8.45	8/23/2023	11:35	VCU
Huguenot	COND	225.7	8/23/2023	11:35	VCU
Huguenot	DO_%	98.6	8/23/2023	11:35	VCU
Huguenot	DO	7.81	8/23/2023	11:35	VCU
Huguenot	TURB	3.59	8/23/2023	11:35	VCU
Huguenot	TSS	3.45	8/23/2023	11:35	VCU
Huguenot	ECOLI-MF	5	8/23/2023	11:35	VCU
Huguenot	TEMP_FIELD	26.8	8/30/2023	13:07	VCU
Huguenot	PH_F	7.88	8/30/2023	13:07	VCU
Huguenot	COND	193.1	8/30/2023	13:07	VCU
Huguenot	DO_%	99.5	8/30/2023	13:07	VCU
Huguenot	DO	7.95	8/30/2023	13:07	VCU
Huguenot	TURB	5.49	8/30/2023	13:07	VCU
Huguenot	TSS	7.10	8/30/2023	13:07	VCU
Huguenot	ECOLI-MF	41	8/30/2023	13:07	VCU
Huguenot	TEMP_FIELD	29.1	9/6/2023	13:26	VCU
Huguenot	PH_F	9.23	9/6/2023	13:26	VCU
Huguenot	COND	215.2	9/6/2023	13:26	VCU

Huguenot	DO_%	114.2	9/6/2023	13:26	VCU
Huguenot	DO	8.76	9/6/2023	13:26	VCU
Huguenot	TURB	2.85	9/6/2023	13:26	VCU
Huguenot	TSS	4.99	9/6/2023	13:26	VCU
Huguenot	ECOLI-MF	22	9/6/2023	13:26	VCU
Huguenot	TEMP_FIELD	28.2	9/13/2023	13:54	VCU
Huguenot	PH_F	8.59	9/13/2023	13:54	VCU
Huguenot	COND	271.1	9/13/2023	13:54	VCU
Huguenot	DO_%	115.0	9/13/2023	13:54	VCU
Huguenot	DO	8.97	9/13/2023	13:54	VCU
Huguenot	TURB	1.82	9/13/2023	13:54	VCU
Huguenot	TSS	1.77	9/13/2023	13:54	VCU
Huguenot	ECOLI-MF	122	9/13/2023	13:54	VCU
Huguenot	TEMP_FIELD	22.5	9/20/2023	8:20	VCU
Huguenot	PH_F	7.87	9/20/2023	8:20	VCU
Huguenot	COND	226.9	9/20/2023	8:20	VCU
Huguenot	DO_%	90.6	9/20/2023	8:20	VCU
Huguenot	DO	7.85	9/20/2023	8:20	VCU
Huguenot	TURB	2.04	9/20/2023	8:20	VCU
Huguenot	TSS	3.88	9/20/2023	8:20	VCU
Huguenot	ECOLI-MF	70	9/20/2023	8:20	VCU
Huguenot	TEMP_FIELD	19.7	9/27/2023	13:42	VCU
Huguenot	PH_F	7.73	9/27/2023	13:42	VCU
Huguenot	COND	176.6	9/27/2023	13:42	VCU
Huguenot	DO_%	102.5	9/27/2023	13:42	VCU
Huguenot	DO	9.33	9/27/2023	13:42	VCU
Huguenot	TURB	3.87	9/27/2023	13:42	VCU
Huguenot	TSS	3.89	9/27/2023	13:42	VCU
Huguenot	ECOLI-MF	58	9/27/2023	13:42	VCU
Huguenot	TEMP_FIELD	21.4	10/4/2023	9:37	VCU
Huguenot	PH_F	7.91	10/4/2023	9:37	VCU
Huguenot	COND	255.1	10/4/2023	9:37	VCU
Huguenot	DO_%	92.0	10/4/2023	9:37	VCU
Huguenot	DO	8.13	10/4/2023	9:37	VCU
Huguenot	TURB	1.92	10/4/2023	9:37	VCU
Huguenot	TSS	1.41	10/4/2023	9:37	VCU
Huguenot	ECOLI-MF	30	10/4/2023	9:37	VCU
Huguenot	TEMP_FIELD	18.5	10/11/2023	13:08	VCU
Huguenot	PH_F	8.39	10/11/2023	13:08	VCU
Huguenot	COND	282.4	10/11/2023	13:08	VCU
Huguenot	DO_%	105.6	10/11/2023	13:08	VCU
Huguenot	DO	9.89	10/11/2023	13:08	VCU
Huguenot	TURB	1.68	10/11/2023	13:08	VCU
Huguenot	TSS	1.94	10/11/2023	13:08	VCU
Huguenot	ECOLI-MF	16	10/11/2023	13:08	VCU
Huguenot	TEMP_FIELD	15.6	10/18/2023	10:14	VCU
Huguenot	PH_F	8.07	10/18/2023	10:14	VCU
Huguenot	COND	256.2	10/18/2023	10:14	VCU
Huguenot	DO_%	95.9	10/18/2023	10:14	VCU
Huguenot	DO	9.54	10/18/2023	10:14	VCU
Huguenot	TURB	1.56	10/18/2023	10:14	VCU
Huguenot	TSS	2.10	10/18/2023	10:14	VCU
Huguenot	ECOLI-MF	27	10/18/2023	10:14	VCU

Huguenot	TEMP_FIELD	15.5	10/25/2023	12:55	VCU
Huguenot	PH_F	8.33	10/25/2023	12:55	VCU
Huguenot	COND	272.2	10/25/2023	12:55	VCU
Huguenot	DO_%	103.0	10/25/2023	12:55	VCU
Huguenot	DO	10.27	10/25/2023	12:55	VCU
Huguenot	TURB	1.69	10/25/2023	12:55	VCU
Huguenot	TSS	1.82	10/25/2023	12:55	VCU
Huguenot	ECOLI-MF	15	10/25/2023	12:55	VCU
Huguenot	TEMP_FIELD	16.8	11/1/2023	12:23	VCU
Huguenot	PH_F	8.10	11/1/2023	12:23	VCU
Huguenot	COND	275.8	11/1/2023	12:23	VCU
Huguenot	DO_%	97.4	11/1/2023	12:23	VCU
Huguenot	DO	9.44	11/1/2023	12:23	VCU
Huguenot	TURB	1.39	11/1/2023	12:23	VCU
Huguenot	TSS	1.69	11/1/2023	12:23	VCU
Huguenot	ECOLI-MF	45	11/1/2023	12:23	VCU
Huguenot	TEMP_FIELD	14.4	11/8/2023	15:41	VCU
Huguenot	PH_F	8.21	11/8/2023	15:41	VCU
Huguenot	COND	294.9	11/8/2023	15:41	VCU
Huguenot	DO_%	109.3	11/8/2023	15:41	VCU
Huguenot	DO	11.16	11/8/2023	15:41	VCU
Huguenot	TURB	1.50	11/8/2023	15:41	VCU
Huguenot	TSS	1.11	11/8/2023	15:41	VCU
Huguenot	ECOLI-MF	21	11/8/2023	15:41	VCU
Huguenot	TEMP_FIELD	11.5	11/15/2023	12:58	VCU
Huguenot	PH_F	8.07	11/15/2023	12:58	VCU
Huguenot	COND	288.9	11/15/2023	12:58	VCU
Huguenot	DO_%	103.8	11/15/2023	12:58	VCU
Huguenot	DO	11.30	11/15/2023	12:58	VCU
Huguenot	TURB	1.68	11/15/2023	12:58	VCU
Huguenot	TSS	1.00	11/15/2023	12:58	VCU
Huguenot	ECOLI-MF	15	11/15/2023	12:58	VCU
Huguenot	TEMP_FIELD	11.4	11/20/2023	13:39	VCU
Huguenot	PH_F	8.07	11/20/2023	13:39	VCU
Huguenot	COND	254.3	11/20/2023	13:39	VCU
Huguenot	DO_%	103.5	11/20/2023	13:39	VCU
Huguenot	DO	11.31	11/20/2023	13:39	VCU
Huguenot	TURB	2.08	11/20/2023	13:39	VCU
Huguenot	TSS	1.39	11/20/2023	13:39	VCU
Huguenot	ECOLI-MF	25	11/20/2023	13:39	VCU
Huguenot	TEMP_FIELD	6.2	11/29/2023	12:45	VCU
Huguenot	PH_F	7.78	11/29/2023	12:45	VCU
Huguenot	COND	224.8	11/29/2023	12:45	VCU
Huguenot	DO_%	101.2	11/29/2023	12:45	VCU
Huguenot	DO	12.52	11/29/2023	12:45	VCU
Huguenot	TURB	3.48	11/29/2023	12:45	VCU
Huguenot	TSS	3.01	11/29/2023	12:45	VCU
Huguenot	ECOLI-MF	79	11/29/2023	12:45	VCU
Mayo	TEMP_FIELD	20.0	4/5/2023	13:40	VCU
Mayo	PH_F	8.46	4/5/2023	13:40	VCU
Mayo	COND	158.7	4/5/2023	13:40	VCU
Mayo	DO_%	105.1	4/5/2023	13:40	VCU
Mayo	DO	9.55	4/5/2023	13:40	VCU

Mayo	TURB	2.46	4/5/2023	13:40	VCU
Mayo	TSS	9.97	4/5/2023	13:40	VCU
Mayo	ECOLI-MF	27	4/5/2023	13:40	VCU
Mayo	TEMP_FIELD	16.2	4/11/2023	12:21	VCU
Mayo	PH_F	8.35	4/11/2023	12:21	VCU
Mayo	COND	139.2	4/11/2023	12:21	VCU
Mayo	DO_%	106.2	4/11/2023	12:21	VCU
Mayo	DO	10.43	4/11/2023	12:21	VCU
Mayo	TURB	1.44	4/11/2023	12:21	VCU
Mayo	TSS	3.97	4/11/2023	12:21	VCU
Mayo	ECOLI-MF	ND	4/11/2023	12:21	VCU
Mayo	TEMP_FIELD	20.0	4/18/2023	13:04	VCU
Mayo	PH_F	8.47	4/18/2023	13:04	VCU
Mayo	COND	150.6	4/18/2023	13:04	VCU
Mayo	DO_%	105.1	4/18/2023	13:04	VCU
Mayo	DO	9.55	4/18/2023	13:04	VCU
Mayo	TURB	1.85	4/18/2023	13:04	VCU
Mayo	TSS	3.40	4/18/2023	13:04	VCU
Mayo	ECOLI-MF	1	4/18/2023	13:04	VCU
Mayo	TEMP_FIELD	19.0	4/25/2023	12:26	VCU
Mayo	PH_F	8.41	4/25/2023	12:26	VCU
Mayo	COND	166.3	4/25/2023	12:26	VCU
Mayo	DO_%	106.3	4/25/2023	12:26	VCU
Mayo	DO	9.86	4/25/2023	12:26	VCU
Mayo	TURB	2.37	4/25/2023	12:26	VCU
Mayo	TSS	4.13	4/25/2023	12:26	VCU
Mayo	ECOLI-MF	26	4/25/2023	12:26	VCU
Mayo	TEMP_FIELD	16.0	5/2/2023	12:34	VCU
Mayo	PH_F	7.52	5/2/2023	12:34	VCU
Mayo	COND	130.0	5/2/2023	12:34	VCU
Mayo	DO_%	97.9	5/2/2023	12:34	VCU
Mayo	DO	9.66	5/2/2023	12:34	VCU
Mayo	TURB	55.70	5/2/2023	12:34	VCU
Mayo	TSS	66.33	5/2/2023	12:34	VCU
Mayo	ECOLI-MF	115	5/2/2023	12:34	VCU
Mayo	TEMP_FIELD	21.0	5/9/2023	12:28	VCU
Mayo	PH_F	8.16	5/9/2023	12:28	VCU
Mayo	COND	120.4	5/9/2023	12:28	VCU
Mayo	DO_%	102.5	5/9/2023	12:28	VCU
Mayo	DO	9.14	5/9/2023	12:28	VCU
Mayo	TURB	6.14	5/9/2023	12:28	VCU
Mayo	TSS	8.45	5/9/2023	12:28	VCU
Mayo	ECOLI-MF	20	5/9/2023	12:28	VCU
Mayo	TEMP_FIELD	22.2	5/16/2023	12:30	VCU
Mayo	PH_F	8.17	5/16/2023	12:30	VCU
Mayo	COND	128.7	5/16/2023	12:30	VCU
Mayo	DO_%	104.7	5/16/2023	12:30	VCU
Mayo	DO	9.12	5/16/2023	12:30	VCU
Mayo	TURB	3.35	5/16/2023	12:30	VCU
Mayo	TSS	4.48	5/16/2023	12:30	VCU
Mayo	ECOLI-MF	45	5/16/2023	12:30	VCU
Mayo	TEMP_FIELD	23.3	5/23/2023	12:31	VCU
Mayo	PH_F	8.83	5/23/2023	12:31	VCU

Mayo	COND	155.6	5/23/2023	12:31	VCU
Mayo	DO_%	110.8	5/23/2023	12:31	VCU
Mayo	DO	9.44	5/23/2023	12:31	VCU
Mayo	TURB	2.65	5/23/2023	12:31	VCU
Mayo	TSS	4.13	5/23/2023	12:31	VCU
Mayo	ECOLI-MF	45	5/23/2023	12:31	VCU
Mayo	TEMP_FIELD	20.5	5/30/2023	12:28	VCU
Mayo	PH_F	7.89	5/30/2023	12:28	VCU
Mayo	COND	175.9	5/30/2023	12:28	VCU
Mayo	DO_%	100.6	5/30/2023	12:28	VCU
Mayo	DO	9.05	5/30/2023	12:28	VCU
Mayo	TURB	2.85	5/30/2023	12:28	VCU
Mayo	TSS	2.14	5/30/2023	12:28	VCU
Mayo	ECOLI-MF	64	5/30/2023	12:28	VCU
Mayo	TEMP_FIELD	23.6	6/6/2023	11:33	VCU
Mayo	PH_F	8.54	6/6/2023	11:33	VCU
Mayo	COND	159.2	6/6/2023	11:33	VCU
Mayo	DO_%	106.4	6/6/2023	11:33	VCU
Mayo	DO	9.01	6/6/2023	11:33	VCU
Mayo	TURB	1.46	6/6/2023	11:33	VCU
Mayo	TSS	2.06	6/6/2023	11:33	VCU
Mayo	ECOLI-MF	31	6/6/2023	11:33	VCU
Mayo	TEMP_FIELD	24.9	6/13/2023	11:27	VCU
Mayo	PH_F	8.34	6/13/2023	11:27	VCU
Mayo	COND	200.9	6/13/2023	11:27	VCU
Mayo	DO_%	104.4	6/13/2023	11:27	VCU
Mayo	DO	8.64	6/13/2023	11:27	VCU
Mayo	TURB	1.12	6/13/2023	11:27	VCU
Mayo	TSS	2.35	6/13/2023	11:27	VCU
Mayo	ECOLI-MF	30	6/13/2023	11:27	VCU
Mayo	TEMP_FIELD	26.5	6/19/2023	12:20	VCU
Mayo	PH_F	8.77	6/19/2023	12:20	VCU
Mayo	COND	217.6	6/19/2023	12:20	VCU
Mayo	DO_%	106.0	6/19/2023	12:20	VCU
Mayo	DO	8.52	6/19/2023	12:20	VCU
Mayo	TURB	1.36	6/19/2023	12:20	VCU
Mayo	TSS	3.25	6/19/2023	12:20	VCU
Mayo	ECOLI-MF	65	6/19/2023	12:20	VCU
Mayo	TEMP_FIELD	25.6	6/27/2023	11:18	VCU
Mayo	PH_F	7.89	6/27/2023	11:18	VCU
Mayo	COND	158.9	6/27/2023	11:18	VCU
Mayo	DO_%	101.3	6/27/2023	11:18	VCU
Mayo	DO	8.27	6/27/2023	11:18	VCU
Mayo	TURB	6.34	6/27/2023	11:18	VCU
Mayo	TSS	9.94	6/27/2023	11:18	VCU
Mayo	ECOLI-MF	161	6/27/2023	11:18	VCU
Mayo	TEMP_FIELD	28.7	7/5/2023	12:03	VCU
Mayo	PH_F	8.21	7/5/2023	12:03	VCU
Mayo	COND	92.0	7/5/2023	12:03	VCU
Mayo	DO_%	103.6	7/5/2023	12:03	VCU
Mayo	DO	8.01	7/5/2023	12:03	VCU
Mayo	TURB	15.20	7/5/2023	12:03	VCU
Mayo	TSS	8.54	7/5/2023	12:03	VCU

Mayo	ECOLI-MF	102	7/5/2023	12:03	VCU
Mayo	TEMP_FIELD	28.5	7/11/2023	12:34	VCU
Mayo	PH_F	8.37	7/11/2023	12:34	VCU
Mayo	COND	137.8	7/11/2023	12:34	VCU
Mayo	DO_%	104.4	7/11/2023	12:34	VCU
Mayo	DO	8.09	7/11/2023	12:34	VCU
Mayo	TURB	9.47	7/11/2023	12:34	VCU
Mayo	TSS	12.24	7/11/2023	12:34	VCU
Mayo	ECOLI-MF	445	7/11/2023	12:34	VCU
Mayo	TEMP_FIELD	25.4	7/18/2023	11:18	VCU
Mayo	PH_F	7.47	7/18/2023	11:18	VCU
Mayo	COND	71.9	7/18/2023	11:18	VCU
Mayo	DO_%	100.9	7/18/2023	11:18	VCU
Mayo	DO	8.27	7/18/2023	11:18	VCU
Mayo	TURB	187.00	7/18/2023	11:18	VCU
Mayo	TSS	157.00	7/18/2023	11:18	VCU
Mayo	ECOLI-MF	500	7/18/2023	11:18	VCU
Mayo	TEMP_FIELD	28.7	7/25/2023	11:51	VCU
Mayo	PH_F	8.71	7/25/2023	11:51	VCU
Mayo	COND	125.8	7/25/2023	11:51	VCU
Mayo	DO_%	110.7	7/25/2023	11:51	VCU
Mayo	DO	8.56	7/25/2023	11:51	VCU
Mayo	TURB	5.33	7/25/2023	11:51	VCU
Mayo	TSS	4.35	7/25/2023	11:51	VCU
Mayo	ECOLI-MF	30	7/25/2023	11:51	VCU
Mayo	TEMP_FIELD	27.6	8/1/2023	9:57	VCU
Mayo	PH_F	8.44	8/1/2023	9:57	VCU
Mayo	COND	145.6	8/1/2023	9:57	VCU
Mayo	DO_%	106.9	8/1/2023	9:57	VCU
Mayo	DO	8.43	8/1/2023	9:57	VCU
Mayo	TURB	2.41	8/1/2023	9:57	VCU
Mayo	TSS	3.34	8/1/2023	9:57	VCU
Mayo	ECOLI-MF	177	8/1/2023	9:57	VCU
Mayo	TEMP_FIELD	27.5	8/8/2023	12:07	VCU
Mayo	PH_F	8.49	8/8/2023	12:07	VCU
Mayo	COND	149.7	8/8/2023	12:07	VCU
Mayo	DO_%	105.3	8/8/2023	12:07	VCU
Mayo	DO	8.31	8/8/2023	12:07	VCU
Mayo	TURB	2.38	8/8/2023	12:07	VCU
Mayo	TSS	3.68	8/8/2023	12:07	VCU
Mayo	ECOLI-MF	238	8/8/2023	12:07	VCU
Mayo	TEMP_FIELD	30.0	8/15/2023	11:15	VCU
Mayo	PH_F	8.57	8/15/2023	11:15	VCU
Mayo	COND	178.7	8/15/2023	11:15	VCU
Mayo	DO_%	106.4	8/15/2023	11:15	VCU
Mayo	DO	8.04	8/15/2023	11:15	VCU
Mayo	TURB	2.58	8/15/2023	11:15	VCU
Mayo	TSS	2.63	8/15/2023	11:15	VCU
Mayo	ECOLI-MF	229	8/15/2023	11:15	VCU
Mayo	TEMP_FIELD	25.8	8/23/2023	10:31	VCU
Mayo	PH_F	8.57	8/23/2023	10:31	VCU
Mayo	COND	222.3	8/23/2023	10:31	VCU
Mayo	DO_%	101.0	8/23/2023	10:31	VCU



Mayo	DO	8.23	8/23/2023	10:31	VCU
Mayo	TURB	1.81	8/23/2023	10:31	VCU
Mayo	TSS	2.66	8/23/2023	10:31	VCU
Mayo	ECOLI-MF	165	8/23/2023	10:31	VCU
Mayo	TEMP_FIELD	27.3	8/30/2023	12:09	VCU
Mayo	PH_F	8.38	8/30/2023	12:09	VCU
Mayo	COND	210.7	8/30/2023	12:09	VCU
Mayo	DO_%	102.9	8/30/2023	12:09	VCU
Mayo	DO	8.15	8/30/2023	12:09	VCU
Mayo	TURB	8.38	8/30/2023	12:09	VCU
Mayo	TSS	21.70	8/30/2023	12:09	VCU
Mayo	ECOLI-MF	192	8/30/2023	12:09	VCU
Mayo	TEMP_FIELD	28.8	9/6/2023	12:21	VCU
Mayo	PH_F	8.90	9/6/2023	12:21	VCU
Mayo	COND	191.5	9/6/2023	12:21	VCU
Mayo	DO_%	109.7	9/6/2023	12:21	VCU
Mayo	DO	8.47	9/6/2023	12:21	VCU
Mayo	TURB	3.37	9/6/2023	12:21	VCU
Mayo	TSS	5.46	9/6/2023	12:21	VCU
Mayo	ECOLI-MF	78	9/6/2023	12:21	VCU
Mayo	TEMP_FIELD	28.0	9/13/2023	13:11	VCU
Mayo	PH_F	8.86	9/13/2023	13:11	VCU
Mayo	COND	258.8	9/13/2023	13:11	VCU
Mayo	DO_%	112.3	9/13/2023	13:11	VCU
Mayo	DO	8.79	9/13/2023	13:11	VCU
Mayo	TURB	1.48	9/13/2023	13:11	VCU
Mayo	TSS	2.28	9/13/2023	13:11	VCU
Mayo	ECOLI-MF	225	9/13/2023	13:11	VCU
Mayo	TEMP_FIELD	22.7	9/20/2023	7:18	VCU
Mayo	PH_F	7.92	9/20/2023	7:18	VCU
Mayo	COND	239.0	9/20/2023	7:18	VCU
Mayo	DO_%	94.4	9/20/2023	7:18	VCU
Mayo	DO	8.13	9/20/2023	7:18	VCU
Mayo	TURB	3.10	9/20/2023	7:18	VCU
Mayo	TSS	3.34	9/20/2023	7:18	VCU
Mayo	ECOLI-MF	79	9/20/2023	7:18	VCU
Mayo	TEMP_FIELD	19.5	9/27/2023	12:53	VCU
Mayo	PH_F	7.98	9/27/2023	12:53	VCU
Mayo	COND	179.1	9/27/2023	12:53	VCU
Mayo	DO_%	103.5	9/27/2023	12:53	VCU
Mayo	DO	9.51	9/27/2023	12:53	VCU
Mayo	TURB	4.68	9/27/2023	12:53	VCU
Mayo	TSS	1.79	9/27/2023	12:53	VCU
Mayo	ECOLI-MF	96	9/27/2023	12:53	VCU
Mayo	TEMP_FIELD	21.6	10/4/2023	10:27	VCU
Mayo	PH_F	8.15	10/4/2023	10:27	VCU
Mayo	COND	235.8	10/4/2023	10:27	VCU
Mayo	DO_%	103.0	10/4/2023	10:27	VCU
Mayo	DO	9.07	10/4/2023	10:27	VCU
Mayo	TURB	1.73	10/4/2023	10:27	VCU
Mayo	TSS	1.43	10/4/2023	10:27	VCU
Mayo	ECOLI-MF	121	10/4/2023	10:27	VCU
Mayo	TEMP_FIELD	19.0	10/11/2023	12:12	VCU

Mayo	PH_F	8.43	10/11/2023	12:12	VCU
Mayo	COND	284.1	10/11/2023	12:12	VCU
Mayo	DO_%	107.2	10/11/2023	12:12	VCU
Mayo	DO	9.92	10/11/2023	12:12	VCU
Mayo	TURB	1.19	10/11/2023	12:12	VCU
Mayo	TSS	1.14	10/11/2023	12:12	VCU
Mayo	ECOLI-MF	99	10/11/2023	12:12	VCU
Mayo	TEMP_FIELD	16.6	10/18/2023	11:04	VCU
Mayo	PH_F	8.29	10/18/2023	11:04	VCU
Mayo	COND	266.7	10/18/2023	11:04	VCU
Mayo	DO_%	103.8	10/18/2023	11:04	VCU
Mayo	DO	10.12	10/18/2023	11:04	VCU
Mayo	TURB	1.62	10/18/2023	11:04	VCU
Mayo	TSS	0.81	10/18/2023	11:04	VCU
Mayo	ECOLI-MF	98	10/18/2023	11:04	VCU
Mayo	TEMP_FIELD	15.4	10/25/2023	12:07	VCU
Mayo	PH_F	8.50	10/25/2023	12:07	VCU
Mayo	COND	270.1	10/25/2023	12:07	VCU
Mayo	DO_%	106.8	10/25/2023	12:07	VCU
Mayo	DO	10.66	10/25/2023	12:07	VCU
Mayo	TURB	1.09	10/25/2023	12:07	VCU
Mayo	TSS	0.95	10/25/2023	12:07	VCU
Mayo	ECOLI-MF	62	10/25/2023	12:07	VCU
Mayo	TEMP_FIELD	14.0	11/1/2023	11:12	VCU
Mayo	PH_F	8.31	11/1/2023	11:12	VCU
Mayo	COND	271.3	11/1/2023	11:12	VCU
Mayo	DO_%	103.7	11/1/2023	11:12	VCU
Mayo	DO	10.69	11/1/2023	11:12	VCU
Mayo	TURB	1.12	11/1/2023	11:12	VCU
Mayo	TSS	0.81	11/1/2023	11:12	VCU
Mayo	ECOLI-MF	85	11/1/2023	11:12	VCU
Mayo	TEMP_FIELD	15.3	11/8/2023	14:54	VCU
Mayo	PH_F	8.47	11/8/2023	14:54	VCU
Mayo	COND	287.8	11/8/2023	14:54	VCU
Mayo	DO_%	109.7	11/8/2023	14:54	VCU
Mayo	DO	10.98	11/8/2023	14:54	VCU
Mayo	TURB	1.36	11/8/2023	14:54	VCU
Mayo	TSS	1.04	11/8/2023	14:54	VCU
Mayo	ECOLI-MF	55	11/8/2023	14:54	VCU
Mayo	TEMP_FIELD	11.3	11/15/2023	11:38	VCU
Mayo	PH_F	8.23	11/15/2023	11:38	VCU
Mayo	COND	295.6	11/15/2023	11:38	VCU
Mayo	DO_%	106.9	11/15/2023	11:38	VCU
Mayo	DO	11.70	11/15/2023	11:38	VCU
Mayo	TURB	1.61	11/15/2023	11:38	VCU
Mayo	TSS	0.85	11/15/2023	11:38	VCU
Mayo	ECOLI-MF	59	11/15/2023	11:38	VCU
Mayo	TEMP_FIELD	10.5	11/20/2023	11:48	VCU
Mayo	PH_F	8.26	11/20/2023	11:48	VCU
Mayo	COND	261.6	11/20/2023	11:48	VCU
Mayo	DO_%	106.5	11/20/2023	11:48	VCU
Mayo	DO	11.88	11/20/2023	11:48	VCU
Mayo	TURB	1.57	11/20/2023	11:48	VCU

Mayo	TSS	1.00	11/20/2023	11:48	VCU
Mayo	ECOLI-MF	45	11/20/2023	11:48	VCU
Mayo	TEMP_FIELD	5.7	11/29/2023	11:25	VCU
Mayo	PH_F	8.05	11/29/2023	11:25	VCU
Mayo	COND	215.8	11/29/2023	11:25	VCU
Mayo	DO_%	103.4	11/29/2023	11:25	VCU
Mayo	DO	12.98	11/29/2023	11:25	VCU
Mayo	TURB	3.43	11/29/2023	11:25	VCU
Mayo	TSS	2.72	11/29/2023	11:25	VCU
Mayo	ECOLI-MF	46	11/29/2023	11:25	VCU
Pine Camp	TEMP_FIELD	17.7	4/13/2023	12:44	VCU
Pine Camp	PH_F	6.33	4/13/2023	12:44	VCU
Pine Camp	COND	167.3	4/13/2023	12:44	VCU
Pine Camp	DO_%	90.4	4/13/2023	12:44	VCU
Pine Camp	DO	8.60	4/13/2023	12:44	VCU
Pine Camp	TURB	2.18	4/13/2023	12:44	VCU
Pine Camp	TSS	1.69	4/13/2023	12:44	VCU
Pine Camp	ECOLI-MF	ND	4/13/2023	12:44	VCU
Pine Camp	DISCHARGE	0.003	4/13/2023	12:44	VCU
Pine Camp	TEMP_FIELD	15.0	4/27/2023	13:05	VCU
Pine Camp	PH_F	6.36	4/27/2023	13:05	VCU
Pine Camp	COND	166.9	4/27/2023	13:05	VCU
Pine Camp	DO_%	83.3	4/27/2023	13:05	VCU
Pine Camp	DO	8.39	4/27/2023	13:05	VCU
Pine Camp	TURB	3.38	4/27/2023	13:05	VCU
Pine Camp	TSS	2.24	4/27/2023	13:05	VCU
Pine Camp	ECOLI-MF	15	4/27/2023	13:05	VCU
Pine Camp	DISCHARGE	0.002	4/27/2023	13:05	VCU
Pine Camp	TEMP_FIELD	16.9	5/11/2023	12:07	VCU
Pine Camp	PH_F	6.32	5/11/2023	12:07	VCU
Pine Camp	COND	165.7	5/11/2023	12:07	VCU
Pine Camp	DO_%	85.0	5/11/2023	12:07	VCU
Pine Camp	DO	8.22	5/11/2023	12:07	VCU
Pine Camp	TURB	2.07	5/11/2023	12:07	VCU
Pine Camp	TSS	1.60	5/11/2023	12:07	VCU
Pine Camp	ECOLI-MF	151	5/11/2023	12:07	VCU
Pine Camp	DISCHARGE	0.003	5/11/2023	12:07	VCU
Pine Camp	TEMP_FIELD	16.1	5/25/2023	11:59	VCU
Pine Camp	PH_F	6.44	5/25/2023	11:59	VCU
Pine Camp	COND	162.9	5/25/2023	11:59	VCU
Pine Camp	DO_%	88.1	5/25/2023	11:59	VCU
Pine Camp	DO	8.66	5/25/2023	11:59	VCU
Pine Camp	TURB	2.89	5/25/2023	11:59	VCU
Pine Camp	TSS	1.72	5/25/2023	11:59	VCU
Pine Camp	ECOLI-MF	81	5/25/2023	11:59	VCU
Pine Camp	DISCHARGE	0.002	5/25/2023	11:59	VCU
Pine Camp	TEMP_FIELD	16.9	6/8/2023	12:20	VCU
Pine Camp	PH_F	6.36	6/8/2023	12:20	VCU
Pine Camp	COND	161.7	6/8/2023	12:20	VCU
Pine Camp	DO_%	83.5	6/8/2023	12:20	VCU
Pine Camp	DO	8.08	6/8/2023	12:20	VCU
Pine Camp	TURB	1.78	6/8/2023	12:20	VCU
Pine Camp	TSS	1.02	6/8/2023	12:20	VCU

Pine Camp	ECOLI-MF	30	6/8/2023	12:20	VCU
Pine Camp	DISCHARGE	0.002	6/8/2023	12:20	VCU
Pine Camp	TEMP_FIELD	20.7	6/22/2023	13:44	VCU
Pine Camp	PH_F	6.36	6/22/2023	13:44	VCU
Pine Camp	COND	108.7	6/22/2023	13:44	VCU
Pine Camp	DO_%	77.1	6/22/2023	13:44	VCU
Pine Camp	DO	6.91	6/22/2023	13:44	VCU
Pine Camp	TURB	4.56	6/22/2023	13:44	VCU
Pine Camp	TSS	3.52	6/22/2023	13:44	VCU
Pine Camp	ECOLI-MF	248	6/22/2023	13:44	VCU
Pine Camp	DISCHARGE	0.002	6/22/2023	13:44	VCU
Pine Camp	TEMP_FIELD	23.5	7/6/2023	12:18	VCU
Pine Camp	PH_F	6.47	7/6/2023	12:18	VCU
Pine Camp	COND	117.9	7/6/2023	12:18	VCU
Pine Camp	DO_%	75.7	7/6/2023	12:18	VCU
Pine Camp	DO	6.44	7/6/2023	12:18	VCU
Pine Camp	TURB	3.13	7/6/2023	12:18	VCU
Pine Camp	TSS	4.62	7/6/2023	12:18	VCU
Pine Camp	ECOLI-MF	>1200	7/6/2023	12:18	VCU
Pine Camp	DISCHARGE	0.002	7/6/2023	12:18	VCU
Pine Camp	TEMP_FIELD	23.7	7/20/2023	11:56	VCU
Pine Camp	PH_F	6.43	7/20/2023	11:56	VCU
Pine Camp	COND	158.4	7/20/2023	11:56	VCU
Pine Camp	DO_%	85.8	7/20/2023	11:56	VCU
Pine Camp	DO	7.24	7/20/2023	11:56	VCU
Pine Camp	TURB	6.39	7/20/2023	11:56	VCU
Pine Camp	TSS	1.88	7/20/2023	11:56	VCU
Pine Camp	ECOLI-MF	268	7/20/2023	11:56	VCU
Pine Camp	DISCHARGE	0.001	7/20/2023	11:56	VCU
Pine Camp	TEMP_FIELD	20.6	8/3/2023	11:04	VCU
Pine Camp	PH_F	6.69	8/3/2023	11:04	VCU
Pine Camp	COND	166.7	8/3/2023	11:04	VCU
Pine Camp	DO_%	84.3	8/3/2023	11:04	VCU
Pine Camp	DO	7.58	8/3/2023	11:04	VCU
Pine Camp	TURB	2.34	8/3/2023	11:04	VCU
Pine Camp	TSS	8.06	8/3/2023	11:04	VCU
Pine Camp	ECOLI-MF	183	8/3/2023	11:04	VCU
Pine Camp	DISCHARGE	0.001	8/3/2023	11:04	VCU
Pine Camp	TEMP_FIELD	23.9	8/17/2023	11:52	VCU
Pine Camp	PH_F	6.52	8/17/2023	11:52	VCU
Pine Camp	COND	161.9	8/17/2023	11:52	VCU
Pine Camp	DO_%	74.7	8/17/2023	11:52	VCU
Pine Camp	DO	6.30	8/17/2023	11:52	VCU
Pine Camp	TURB	2.64	8/17/2023	11:52	VCU
Pine Camp	TSS	1.46	8/17/2023	11:52	VCU
Pine Camp	ECOLI-MF	TNTC	8/17/2023	11:52	VCU
Pine Camp	DISCHARGE	0.001	8/17/2023	11:52	VCU
Pine Camp	TEMP_FIELD	23.1	8/29/2023	11:35	VCU
Pine Camp	PH_F	6.39	8/29/2023	11:35	VCU
Pine Camp	COND	77.0	8/29/2023	11:35	VCU
Pine Camp	DO_%	73.3	8/29/2023	11:35	VCU
Pine Camp	DO	6.28	8/29/2023	11:35	VCU
Pine Camp	TURB	8.86	8/29/2023	11:35	VCU

Pine Camp	TSS	2.44	8/29/2023	11:35	VCU
Pine Camp	ECOLI-MF	14	8/29/2023	11:35	VCU
Pine Camp	DISCHARGE	0.002	8/29/2023	11:35	VCU
Pine Camp	TEMP_FIELD	22.3	9/12/2023	11:29	VCU
Pine Camp	PH_F	6.42	9/12/2023	11:29	VCU
Pine Camp	COND	113.2	9/12/2023	11:29	VCU
Pine Camp	DO_%	68.3	9/12/2023	11:29	VCU
Pine Camp	DO	5.94	9/12/2023	11:29	VCU
Pine Camp	TURB	2.89	9/12/2023	11:29	VCU
Pine Camp	TSS	5.11	9/12/2023	11:29	VCU
Pine Camp	ECOLI-MF	105	9/12/2023	11:29	VCU
Pine Camp	DISCHARGE	0.001	9/12/2023	11:29	VCU
Pine Camp	TEMP_FIELD	18.3	9/26/2023	11:21	VCU
Pine Camp	PH_F	6.60	9/26/2023	11:21	VCU
Pine Camp	COND	153.6	9/26/2023	11:21	VCU
Pine Camp	DO_%	86.5	9/26/2023	11:21	VCU
Pine Camp	DO	8.14	9/26/2023	11:21	VCU
Pine Camp	TURB	3.10	9/26/2023	11:21	VCU
Pine Camp	TSS	1.82	9/26/2023	11:21	VCU
Pine Camp	ECOLI-MF	122	9/26/2023	11:21	VCU
Pine Camp	DISCHARGE	0.002	9/26/2023	11:21	VCU
Pine Camp	TEMP_FIELD	14.1	10/10/2023	11:42	VCU
Pine Camp	PH_F	6.73	10/10/2023	11:42	VCU
Pine Camp	COND	174.8	10/10/2023	11:42	VCU
Pine Camp	DO_%	87.9	10/10/2023	11:42	VCU
Pine Camp	DO	9.03	10/10/2023	11:42	VCU
Pine Camp	TURB	1.30	10/10/2023	11:42	VCU
Pine Camp	TSS	0.75	10/10/2023	11:42	VCU
Pine Camp	ECOLI-MF	276	10/10/2023	11:42	VCU
Pine Camp	DISCHARGE	0.001	10/10/2023	11:42	VCU
Pine Camp	TEMP_FIELD	11.1	10/24/2023	11:20	VCU
Pine Camp	PH_F	6.73	10/24/2023	11:20	VCU
Pine Camp	COND	154.0	10/24/2023	11:20	VCU
Pine Camp	DO_%	91.6	10/24/2023	11:20	VCU
Pine Camp	DO	10.1	10/24/2023	11:20	VCU
Pine Camp	TURB	1.01	10/24/2023	11:20	VCU
Pine Camp	TSS	1.32	10/24/2023	11:20	VCU
Pine Camp	ECOLI-MF	126	10/24/2023	11:20	VCU
Pine Camp	DISCHARGE	0.001	10/24/2023	11:20	VCU
Pine Camp	TEMP_FIELD	14.2	11/7/2023	12:48	VCU
Pine Camp	PH_F	6.38	11/7/2023	12:48	VCU
Pine Camp	COND	164.7	11/7/2023	12:48	VCU
Pine Camp	DO_%	53.5	11/7/2023	12:48	VCU
Pine Camp	DO	5.44	11/7/2023	12:48	VCU
Pine Camp	TURB	1.04	11/7/2023	12:48	VCU
Pine Camp	TSS	4.52	11/7/2023	12:48	VCU
Pine Camp	ECOLI-MF	98	11/7/2023	12:48	VCU
Pine Camp	DISCHARGE	0.001	11/7/2023	12:48	VCU
Pine Camp	TEMP_FIELD	10.5	11/21/2023	11:19	VCU
Pine Camp	PH_F	7.24	11/21/2023	11:19	VCU
Pine Camp	COND	297.1	11/21/2023	11:19	VCU
Pine Camp	DO_%	83.2	11/21/2023	11:19	VCU
Pine Camp	DO	9.28	11/21/2023	11:19	VCU

Pine Camp	TURB	5.62	11/21/2023	11:19	VCU
Pine Camp	TSS	7.46	11/21/2023	11:19	VCU
Pine Camp	ECOLI-MF	0	11/21/2023	11:19	VCU
Pine Camp	DISCHARGE	0.009	11/21/2023	11:19	VCU
Reedy	TEMP_FIELD	16.6	4/13/2023	10:47	VCU
Reedy	PH_F	7.57	4/13/2023	10:47	VCU
Reedy	COND	196.8	4/13/2023	10:47	VCU
Reedy	DO_%	105.7	4/13/2023	10:47	VCU
Reedy	DO	10.31	4/13/2023	10:47	VCU
Reedy	TURB	1.95	4/13/2023	10:47	VCU
Reedy	TSS	1.86	4/13/2023	10:47	VCU
Reedy	ECOLI-MF	ND	4/13/2023	10:47	VCU
Reedy	DISCHARGE	0.017	4/13/2023	10:47	VCU
Reedy	TEMP_FIELD	14.7	4/27/2023	8:24	VCU
Reedy	PH_F	7.36	4/27/2023	8:24	VCU
Reedy	COND	193.4	4/27/2023	8:24	VCU
Reedy	DO_%	104.8	4/27/2023	8:24	VCU
Reedy	DO	10.60	4/27/2023	8:24	VCU
Reedy	TURB	2.26	4/27/2023	8:24	VCU
Reedy	TSS	1.55	4/27/2023	8:24	VCU
Reedy	ECOLI-MF	39	4/27/2023	8:24	VCU
Reedy	DISCHARGE	0.015	4/27/2023	8:24	VCU
Reedy	TEMP_FIELD	17.2	5/11/2023	10:03	VCU
Reedy	PH_F	7.45	5/11/2023	10:03	VCU
Reedy	COND	176.3	5/11/2023	10:03	VCU
Reedy	DO_%	103.3	5/11/2023	10:03	VCU
Reedy	DO	9.94	5/11/2023	10:03	VCU
Reedy	TURB	1.74	5/11/2023	10:03	VCU
Reedy	TSS	1.26	5/11/2023	10:03	VCU
Reedy	ECOLI-MF	92	5/11/2023	10:03	VCU
Reedy	DISCHARGE	0.020	5/11/2023	10:03	VCU
Reedy	TEMP_FIELD	17.7	5/25/2023	10:01	VCU
Reedy	PH_F	7.24	5/25/2023	10:01	VCU
Reedy	COND	191.4	5/25/2023	10:01	VCU
Reedy	DO_%	92.6	5/25/2023	10:01	VCU
Reedy	DO	8.83	5/25/2023	10:01	VCU
Reedy	TURB	3.44	5/25/2023	10:01	VCU
Reedy	TSS	1.18	5/25/2023	10:01	VCU
Reedy	ECOLI-MF	163	5/25/2023	10:01	VCU
Reedy	DISCHARGE	0.023	5/25/2023	10:01	VCU
Reedy	TEMP_FIELD	18.6	6/8/2023	10:06	VCU
Reedy	PH_F	7.56	6/8/2023	10:06	VCU
Reedy	COND	198.2	6/8/2023	10:06	VCU
Reedy	DO_%	98.8	6/8/2023	10:06	VCU
Reedy	DO	9.24	6/8/2023	10:06	VCU
Reedy	TURB	1.89	6/8/2023	10:06	VCU
Reedy	TSS	2.66	6/8/2023	10:06	VCU
Reedy	ECOLI-MF	153	6/8/2023	10:06	VCU
Reedy	DISCHARGE	0.015	6/8/2023	10:06	VCU
Reedy	TEMP_FIELD	22.6	6/22/2023	11:17	VCU
Reedy	PH_F	7.40	6/22/2023	11:17	VCU
Reedy	COND	115.2	6/22/2023	11:17	VCU
Reedy	DO_%	82.2	6/22/2023	11:17	VCU

Reedy	DO	7.10	6/22/2023	11:17	VCU
Reedy	TURB	2.56	6/22/2023	11:17	VCU
Reedy	TSS	2.35	6/22/2023	11:17	VCU
Reedy	ECOLI-MF	364	6/22/2023	11:17	VCU
Reedy	DISCHARGE	0.014	6/22/2023	11:17	VCU
Reedy	TEMP_FIELD	25.1	7/6/2023	10:02	VCU
Reedy	PH_F	7.22	7/6/2023	10:02	VCU
Reedy	COND	84.8	7/6/2023	10:02	VCU
Reedy	DO_%	97.2	7/6/2023	10:02	VCU
Reedy	DO	8.02	7/6/2023	10:02	VCU
Reedy	TURB	3.75	7/6/2023	10:02	VCU
Reedy	TSS	5.84	7/6/2023	10:02	VCU
Reedy	ECOLI-MF	>1200	7/6/2023	10:02	VCU
Reedy	DISCHARGE	0.066	7/6/2023	10:02	VCU
Reedy	TEMP_FIELD	24.7	7/20/2023	9:50	VCU
Reedy	PH_F	7.42	7/20/2023	9:50	VCU
Reedy	COND	177.8	7/20/2023	9:50	VCU
Reedy	DO_%	98.2	7/20/2023	9:50	VCU
Reedy	DO	8.16	7/20/2023	9:50	VCU
Reedy	TURB	2.06	7/20/2023	9:50	VCU
Reedy	TSS	1.22	7/20/2023	9:50	VCU
Reedy	ECOLI-MF	272	7/20/2023	9:50	VCU
Reedy	DISCHARGE	0.026	7/20/2023	9:50	VCU
Reedy	TEMP_FIELD	20.9	8/3/2023	8:55	VCU
Reedy	PH_F	7.35	8/3/2023	8:55	VCU
Reedy	COND	192.2	8/3/2023	8:55	VCU
Reedy	DO_%	91.2	8/3/2023	8:55	VCU
Reedy	DO	8.15	8/3/2023	8:55	VCU
Reedy	TURB	1.06	8/3/2023	8:55	VCU
Reedy	TSS	3.92	8/3/2023	8:55	VCU
Reedy	ECOLI-MF	224	8/3/2023	8:55	VCU
Reedy	DISCHARGE	0.013	8/3/2023	8:55	VCU
Reedy	TEMP_FIELD	23.9	8/17/2023	9:50	VCU
Reedy	PH_F	7.41	8/17/2023	9:50	VCU
Reedy	COND	204.6	8/17/2023	9:50	VCU
Reedy	DO_%	88.2	8/17/2023	9:50	VCU
Reedy	DO	7.45	8/17/2023	9:50	VCU
Reedy	TURB	0.94	8/17/2023	9:50	VCU
Reedy	TSS	0.33	8/17/2023	9:50	VCU
Reedy	ECOLI-MF	75	8/17/2023	9:50	VCU
Reedy	DISCHARGE	0.006	8/17/2023	9:50	VCU
Reedy	TEMP_FIELD	23.7	8/29/2023	9:27	VCU
Reedy	PH_F	7.02	8/29/2023	9:27	VCU
Reedy	COND	99.6	8/29/2023	9:27	VCU
Reedy	DO_%	79.1	8/29/2023	9:27	VCU
Reedy	DO	6.70	8/29/2023	9:27	VCU
Reedy	TURB	3.47	8/29/2023	9:27	VCU
Reedy	TSS	2.17	8/29/2023	9:27	VCU
Reedy	ECOLI-MF	31	8/29/2023	9:27	VCU
Reedy	DISCHARGE	0.026	8/29/2023	9:27	VCU
Reedy	TEMP_FIELD	22.3	9/12/2023	9:25	VCU
Reedy	PH_F	7.21	9/12/2023	9:25	VCU
Reedy	COND	157.0	9/12/2023	9:25	VCU

Reedy	DO_%	82.4	9/12/2023	9:25	VCU
Reedy	DO	7.14	9/12/2023	9:25	VCU
Reedy	TURB	1.30	9/12/2023	9:25	VCU
Reedy	TSS	2.18	9/12/2023	9:25	VCU
Reedy	ECOLI-MF	84	9/12/2023	9:25	VCU
Reedy	DISCHARGE	0.010	9/12/2023	9:25	VCU
Reedy	TEMP_FIELD	19.4	9/26/2023	9:19	VCU
Reedy	PH_F	7.41	9/26/2023	9:19	VCU
Reedy	COND	257.2	9/26/2023	9:19	VCU
Reedy	DO_%	95.1	9/26/2023	9:19	VCU
Reedy	DO	8.74	9/26/2023	9:19	VCU
Reedy	TURB	4.40	9/26/2023	9:19	VCU
Reedy	TSS	1.60	9/26/2023	9:19	VCU
Reedy	ECOLI-MF	55	9/26/2023	9:19	VCU
Reedy	DISCHARGE	0.043	9/26/2023	9:19	VCU
Reedy	TEMP_FIELD	14.0	10/10/2023	9:40	VCU
Reedy	PH_F	7.54	10/10/2023	9:40	VCU
Reedy	COND	308.4	10/10/2023	9:40	VCU
Reedy	DO_%	93.6	10/10/2023	9:40	VCU
Reedy	DO	9.66	10/10/2023	9:40	VCU
Reedy	TURB	0.60	10/10/2023	9:40	VCU
Reedy	TSS	0.01	10/10/2023	9:40	VCU
Reedy	ECOLI-MF	218	10/10/2023	9:40	VCU
Reedy	DISCHARGE	0.017	10/10/2023	9:40	VCU
Reedy	TEMP_FIELD	10.8	10/24/2023	9:20	VCU
Reedy	PH_F	7.28	10/24/2023	9:20	VCU
Reedy	COND	227.4	10/24/2023	9:20	VCU
Reedy	DO_%	88.8	10/24/2023	9:20	VCU
Reedy	DO	9.83	10/24/2023	9:20	VCU
Reedy	TURB	0.87	10/24/2023	9:20	VCU
Reedy	TSS	0.19	10/24/2023	9:20	VCU
Reedy	ECOLI-MF	87	10/24/2023	9:20	VCU
Reedy	DISCHARGE	0.012	10/24/2023	9:20	VCU
Reedy	TEMP_FIELD	12.9	11/7/2023	10:44	VCU
Reedy	PH_F	7.40	11/7/2023	10:44	VCU
Reedy	COND	271.4	11/7/2023	10:44	VCU
Reedy	DO_%	92.2	11/7/2023	10:44	VCU
Reedy	DO	9.73	11/7/2023	10:44	VCU
Reedy	TURB	1.01	11/7/2023	10:44	VCU
Reedy	TSS	0.41	11/7/2023	10:44	VCU
Reedy	ECOLI-MF	33	11/7/2023	10:44	VCU
Reedy	DISCHARGE	0.014	11/7/2023	10:44	VCU
Reedy	TEMP_FIELD	9.1	11/21/2023	9:11	VCU
Reedy	PH_F	7.22	11/21/2023	9:11	VCU
Reedy	COND	261.3	11/21/2023	9:11	VCU
Reedy	DO_%	75.4	11/21/2023	9:11	VCU
Reedy	DO	8.69	11/21/2023	9:11	VCU
Reedy	TURB	2.89	11/21/2023	9:11	VCU
Reedy	TSS	2.79	11/21/2023	9:11	VCU
Reedy	ECOLI-MF	53	11/21/2023	9:11	VCU
Reedy	DISCHARGE	0.010	11/21/2023	9:11	VCU



Second Interim Report:  
Microbial Source Tracking of Fecal  
Contamination in the  
James River Estuary and Richmond Urban  
Streams

RIMA FRANKLIN & PAUL BUKAVECKAS  
VIRGINIA COMMONWEALTH UNIVERSITY

JUNE 2023

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# Approach to Sample Analysis

## 2020 Samples

James	monthly from 3 sites (Total = 28 samples) <i>Riverine: Huguenot Bridge</i> <i>Estuarine: CSO#04, B157 (Osborne Landing)</i>
STREAM	5 sites: Broad Rock, Gillies, Reedy, Shockoe, Westham Selected samples with high CFU (highlighted in yellow) Total = 20 samples
TARGETS	4 animals, 6 genes Human Bacteroidetes (HF183) Dog Bacteroidetes (Dbact) Cow-Ruminant Bacteroidetes (BacR, Rum2Bac) Canada Goose Bacteroidetes (CGBac1, CGBac2)

## 2022 Samples

James	monthly from 2 sites (Total = 24 samples) <i>Riverine: Huguenot Bridge</i> <i>Estuarine: CSO#04</i>
STREAM	monthly from 3 sites (Total = 36 samples) Broad Rock, Gillies & Reedy
TARGETS	3 animals, 4 genes Human Bacteroidetes (HF183) Dog Bacteroidetes (Dbact) Cow-Ruminant Bacteroidetes (BacR, Rum2Bac)

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# 2020 Results

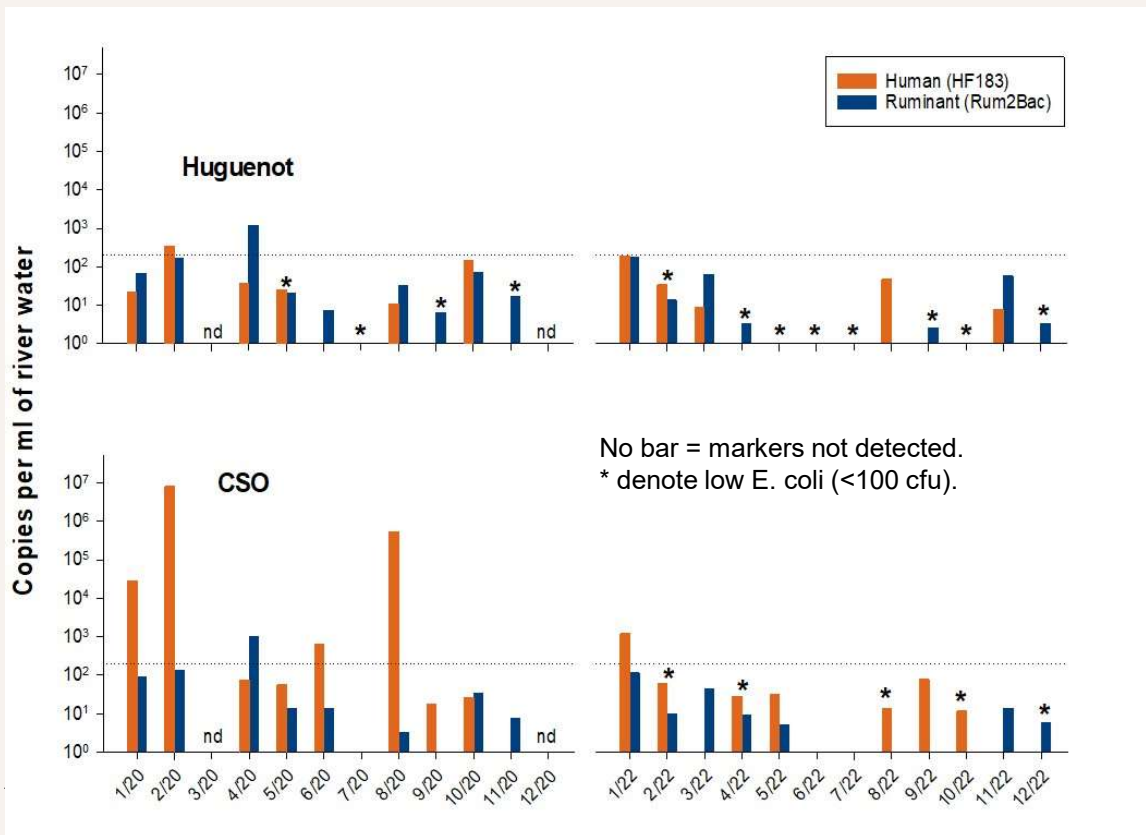
## Overview

- 47 total samples (1 failed) = 27 river, 20 streams
- data reported as gene copies per ml
- detection limit is 0.3 gene copies per ml
- reporting limit is 17 copies per ml

Detection freq (%)		James	Stream	Overall
Human	HF183	77.8	85.0	80.9
Dog	Dbact	40.7	75.0	55.3
Ruminant	BacR	59.3	0.0	34.0
Ruminant	Rum2Bac	77.8	25.0	55.3
Goose	CGBac1	0.0	5.0	2.1
Goose	CGBac2	0.0	5.0	2.1

- Human signal most common detect at all sites (~81% of samples).
- Ruminant signal second most common detect in James (78%).
- Dog second most common detect in Richmond streams (75%).
- Goose signal rare at all sites.

# James: 2020 & 2022 Results



## Huguenot:

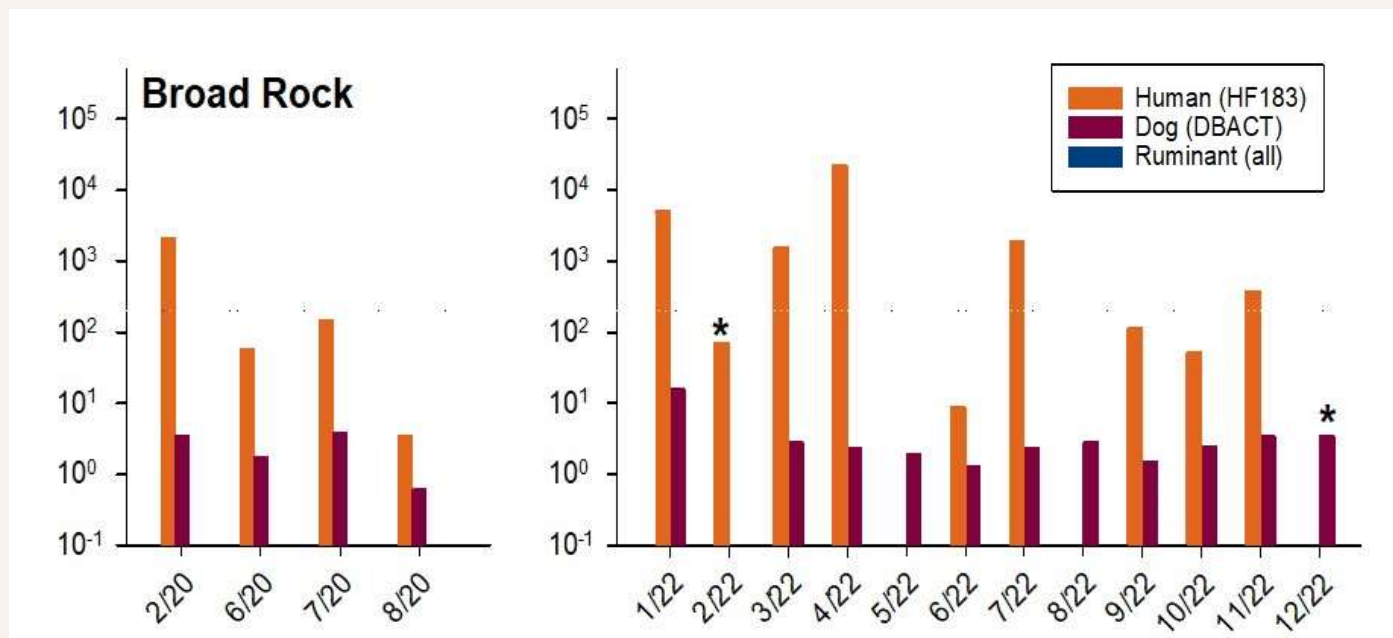
- markers detected in 17/22 samples.
- Ruminant > Human in 11/17 positive samples.

## CSO:

- Markers detected in 19/22 samples
- Human > ruminant
- High detects (>200/ml) associated with human markers.

# Broad Rock

- Human markers detected in 13/16 samples (81%).
- Dog markers detected in 15/16 samples (94%).
- No Ruminant detects.



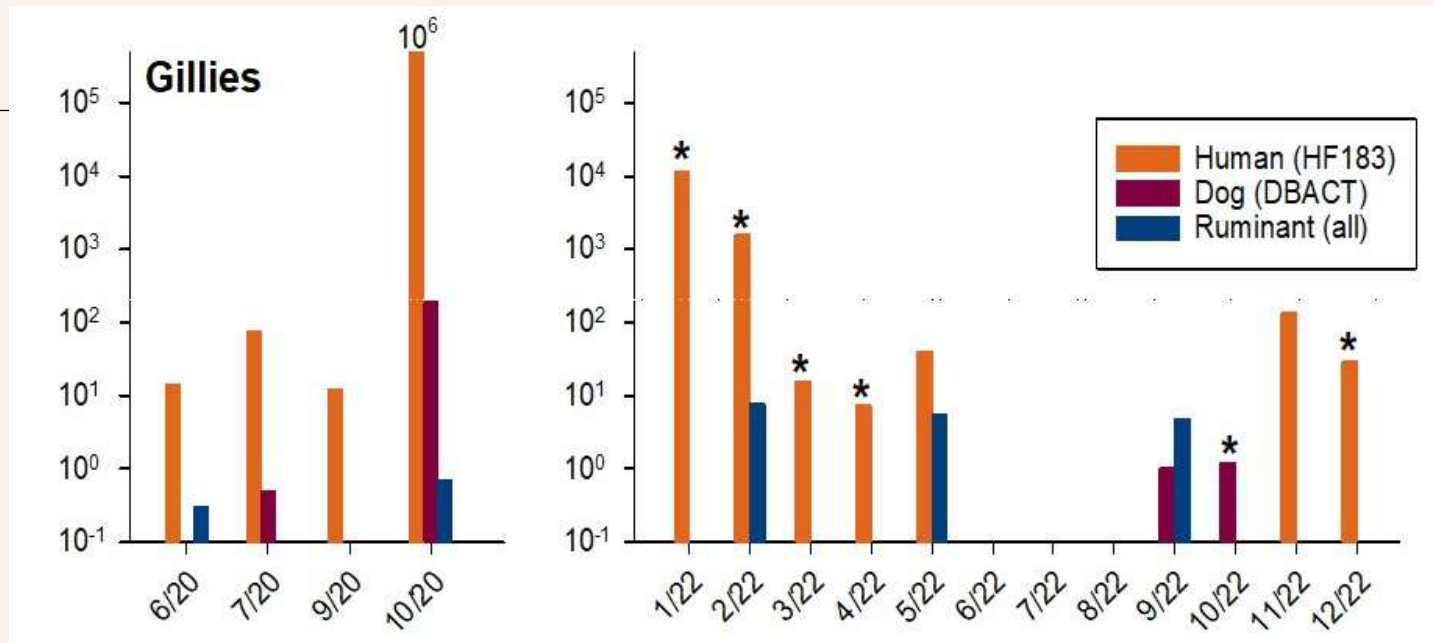
Means (2020):

Human = 2575 copies/ml

Dog = 3 copies/ml

# Gillies Creek

- Human markers detected in 11/16 samples (69%).
- Dog markers detected in 4/16 samples (25%).
- Ruminant markers detected in 5/16 samples (31%).



Means (2020):

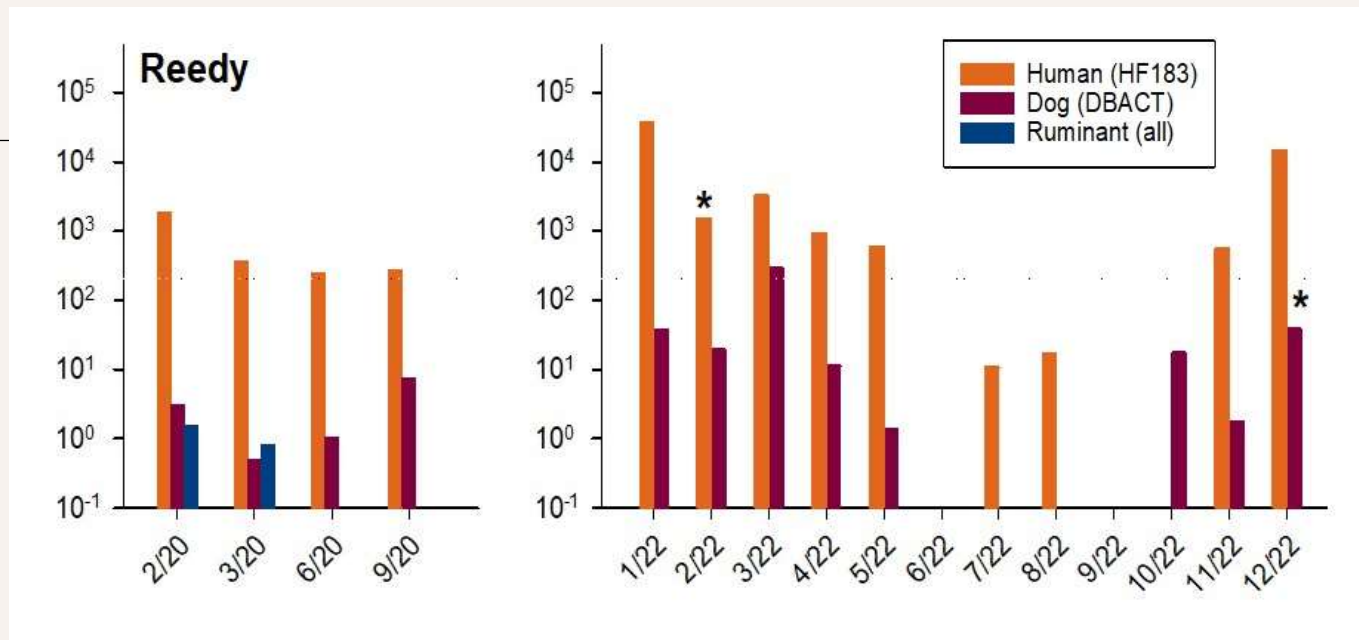
Human = 1108 copies/ml

Dog <1 copies/ml

Ruminant = 1.5 copies/ml

# Reedy Creek

- Human markers detected in 13/16 samples (81%).
- Dog markers detected in 15/16 samples (94%).
- No Ruminant detects.



Means (2020):

Human = 2575 copies/ml

Dog = 3 copies/ml

## Stream Summary

- Human - main source for all stream sites (highest median values at Broad Rock & Reedy).
- Dog – commonly found, but marker abundance much lower than for human.
- Ruminant – common only at Gillies Creek.

## James Summary

- Human signal increases from river to estuary.
- Ruminant signal decreases from river to estuary.
- Dog - not common (only 1/24 samples in 2022).

## Next Steps

- Analysis of monthly samples from James (Huguenot, CSO#04) and Richmond streams (Broad Rock, Reedy & Gillies) for 2023 (N = 60 samples).
- Markers: Human, dog, ruminant.