

# Combined Sewer System Annual Report No. 29 for 2023

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Prepared for  
Virginia Department of Environmental Quality

March 27, 2024



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RIVERRENEW IS AN INITIATIVE TO ACHIEVE CLEANER, HEALTHIER WATERWAYS IN ALEXANDRIA BY UPGRADING OUR CENTURY-OLD COMBINED SEWER SYSTEM. THE RIVERRENEW TUNNEL PROJECT WILL CONNECT TO THE EXISTING SEWER SYSTEM TO PREVENT MILLIONS OF GALLONS OF COMBINED SEWAGE FROM REACHING OUR RIVERS AND STREAMS. OUR SHARED GOAL IS TO CREATE A BRIGHTER FUTURE FOR OUR FAMILIES, BUSINESSES, AND WATERWAYS.

# Table of Contents

List of Figures .....	iii
List of Tables.....	iii
List of References.....	iv
Section 1 Introduction and Summary .....	1-1
1.1 Introduction.....	1-1
1.2 Combined Sewer System – General.....	1-1
1.3 Combined Sewer System – Facilities and Operation .....	1-2
1.4 VPDES Permit .....	1-4
1.5 Nine Minimum Controls .....	1-5
Section 2 Combined Sewer Overflow Characterization.....	2-1
2.1 General.....	2-1
2.2 Summary of 2023 Rainfall Data .....	2-1
2.3 Rainfall Data and Model Results for CSO Outfalls .....	2-2
2.4 Summary of Model Updates .....	2-4
Section 3 Operations and Regular Maintenance Programs .....	3-1
3.1 Inspection and Maintenance of CSS.....	3-1
3.2 Preventive Maintenance .....	3-1
3.3 Training .....	3-1
3.4 Allocation of Funds for Operation and Maintenance .....	3-2
Section 4 Maximize Use of Collection System for Storage .....	4-1
Section 5 Control of Non-Domestic Discharges .....	5-1
Section 6 Maximize Flow to the Water Resource Recovery Facility .....	6-1
Section 7 Dry Weather Overflows.....	7-1
Section 8 Control of Solid and Floatable Material in CSOs.....	8-1
Section 9 Pollution Prevention .....	9-1
Section 10 Public Notification .....	10-1
Section 11 CSO Monitoring.....	11-1
Section 12 Implementation of the Long-Term Control Plan Update .....	12-1
12.1 General.....	12-1
12.2 RiverRenew Projects .....	12-1
12.3 Implementation Progress.....	12-1
12.4 Long-Term Control Plan Update Public Notification and Participation .....	12-3
12.5 RiverRenew Stakeholder Advisory Group Update .....	12-4



Appendix A: 2023 Rainfall and Overflow Modeling Report..... A-1  
Appendix B: AlexRenew Outfall and Diversion Structure Inspection Forms ..... B-1  
Appendix C: Sewer Rehabilitation and Pollution Abatement 10-Year CIP ..... C-1  
Appendix D: Staff Training Records.....D-1  
Appendix E: Record of Street Sweeping..... E-1  
Appendix F: Record of CSS Trunk Sewer Flushing ..... F-1  
Appendix G: Record of Catch Basin Cleaning ..... G-1  
Appendix H: Leaf Collection Program ..... H-1  
Appendix I: Illicit Discharge Ordinance..... I-1  
Appendix J: Public Notice ..... J-1  
Appendix K: Public Meetings ..... K-1



## List of Figures

---

Figure 1-1. CSS Areas and CSO Outfall Locations.....	1-2
Figure 1-2. Pendleton Street Outfall 019 and Regulator.....	1-3
Figure 1-3. Royal Street Outfall 020 and Regulator.....	1-4
Figure 1-4. King & West Street Regulator Outfall 021 and Duke Street Regulator Outfall 022.....	1-4
Figure 10-1. Public Notice Sign at Pendleton Street Outfall 019.....	10-2
Figure 10-2. Public Notice Sign at Royal Street Outfall 020.....	10-3
Figure 10-3. Public Notice Sign at Hooffs Run.....	10-4
Figure 10-4. Public Notice Sign at Duke Street and Hooffs Run Outfalls 021 & 022.....	10-5

## List of Tables

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Table 1-1. Length of Sewers in CSS Area <sup>1</sup> .....	1-1
Table 1-2. CSS and CSO Characteristics <sup>1</sup> .....	1-3
Table 1-3. Summary of Nine Minimum Control Activities.....	1-5
Table 2-1. Summary of 2023 Rainfall Events.....	2-1
Table 2-2. 2023 Rainfall and Overflow Model Summary.....	2-2
Table 2-3. Average CSS Performance.....	2-3
Table 12-2. Permit Progress and Milestones for RiverRenew as of December 31, 2023.....	12-2
Table 12-3. Implementation Progress and Milestones for RiverRenew as of December 31, 2023.....	12-3



## List of References

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The documents listed below were used to develop the Combined Sewer System Annual Report No. 29 for 2023 and are referenced throughout the document. These references should be used to gain a deeper understanding of conclusions that are referenced in this report.

1. Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0025160
2. Combined Sewer System Long Term Control Plan Update, June 2018
3. Outfall Transfer Agreement Between the City of Alexandria, Virginia and the City of Alexandria Sanitation Authority Concerning Wet Weather Wastewater Storage and Conveyance Facilities, May 2018

# Section 1 Introduction and Summary

## 1.1 Introduction

Alexandria, Virginia is located along the west side of the Potomac River, approximately 8 miles south of Washington, DC. Alexandria has a land area of approximately 9,800 acres and an estimated population of 155,525 as of 2022, according to the U.S. Census Bureau.

A portion of Alexandria is served by a combined sewer system (CSS). The Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0025160 (Permit), which includes requirements for the CSS, is the responsibility of AlexRenew, the wastewater treatment authority in Alexandria.

Part V.I.4 of Permit requires AlexRenew to submit an annual report on the combined sewer system (CSS) by March 31<sup>st</sup> of each year to the Virginia Department of Environmental Quality (VDEQ). This report is the twenty-ninth CSS Annual Report for the Alexandria's CSS and summarizes information for calendar year 2023.

## 1.2 Combined Sewer System – General

Alexandria's sewer system covers approximately 15.4 square miles of which 540 acres, or 6 percent, is served by the CSS. The CSS is generally located in the Old Town area, east of U.S. Route 1, and comprises three separate areas and four permitted combined sewer overflow (CSO) outfalls as shown in Figure 1-1.. The CSS areas are a combination of combined, sanitary, and storm sewer systems. The smaller sanitary and storm sewer pipe diameters range from 4 to 60 inches (in) connecting to larger combined sewers with pipe diameters ranging from 8 to 72 in. A breakdown of the sewer pipe lengths per CSS area is provided in Table 1-1.

**Table 1-1. Length of Sewers in CSS Area<sup>1</sup>**

CSS Area	Combined Sewers (miles)	Sanitary Sewer (miles)	Storm Sewers (miles)
Pendleton (Outfall 019) <sup>2</sup>	3.83	7.35	5.49
Royal (Outfall 020) <sup>2</sup>	3.10	7.71	2.94
King and West (Outfalls 021 and 022) <sup>2</sup>	3.02	3.11	1.40

<sup>1</sup>Data Source: Combined Sewer System Characterization, City of Alexandria, 2014.

<sup>2</sup> Outfalls 001, 002, 003, and 004 were reassigned as 019, 020, 021, and 022 respectively, as of the issuance of VPDES Permit VA0025160. See Section 1.4 for more details.



Figure 1-1. CSS Areas and CSO Outfall Locations

### 1.3 Combined Sewer System – Facilities and Operation

Historically, the City of Alexandria (City) has owned the CSS, including the CSO outfalls that discharge overflows under wet weather conditions to the waters of the Commonwealth of Virginia. As of May 1, 2018, ownership of the four CSO outfalls was transferred to AlexRenew per an agreement between the City and AlexRenew, known as the *Outfall Transfer Agreement Between the City of Alexandria, Virginia and the City of Alexandria Sanitation Authority Concerning Wet Weather Wastewater Storage and Conveyance Facilities, May 2018* (Outfall Transfer Agreement). With the transfer of outfall ownership, AlexRenew assumed responsibility for the implementation of the Long-Term Control Plan Update (LTCPU), approved by the VDEQ on June 29, 2018. The City retained ownership of and continues to maintain the CSS collection system.

AlexRenew operates the CSS interceptors, CSO outfalls, and a 54 MGD Water Resource Recovery Facility (WRRF) in accordance with Individual VPDES Permit No. VA0025160 and General Permit No. VAN0010059. The WRRF serves a 51-square mile area which includes Alexandria and portions of Fairfax County. The WRRF discharges effluent to Hunting Creek, a tributary of the Potomac River. The wastewater flows generated within Alexandria are treated by both AlexRenew’s WRRF and Arlington County’s Water Pollution Control Plant (WPCP). The Arlington County WPCP treats approximately 7.8 percent of the Alexandria’s wastewater flows while AlexRenew’s WRRF treats 92.2 percent of the Alexandria’s wastewater flows.

Under normal dry weather conditions and during most rainfall events, the combined sewer flow collected in the CSS is conveyed to AlexRenew’s WRRF. During periods of rainfall, the capacity of the CSS may be exceeded, and excess combined sewer flow is discharged directly to Hunting Creek, Hooffs Run, or Oronoco Bay through the four permitted CSO outfalls. Table 1-2 provides the characteristics of the dry and wet weather conveyance for each CSS area and CSO outfall regulated under the VPDES Permit. Detailed maps illustrating each CSO outfall location are presented in Figure 1-2, Figure 1-3, and Figure 1-4.

**Table 1-2. CSS and CSO Characteristics<sup>1</sup>**

CSO Regulator & Number	CSS Area	Area (ac)	Dry Weather Conveyance	Wet Weather Conveyance
Pendleton Street (Outfall 019) <sup>2</sup>	Pendleton	230	Potomac Interceptor to WRRF	Weir Overflow and Discharge to Oronoco Bay
Royal Street (Outfall 020) <sup>2</sup>	Royal	194	Potomac Interceptor to WRRF	Weir Overflow and Discharge to Hunting Creek
King and West Street (Outfall 021) <sup>2</sup>	King and West	120	Commonwealth Interceptor to WRRF	Weir Overflow and Discharge to Hooffs Run
Duke Street (Outfall 022) <sup>2</sup>				

<sup>1</sup>Data Source: Combined Sewer System Characterization, City of Alexandria, 2014.

<sup>2</sup> Outfalls 001, 002, 003, and 004 were reassigned as 019, 020, 021, and 022 respectively, as of the issuance of VPDES Permit VA0025160. See Section 1.4 for more details.



**Figure 1-2. Pendleton Street Outfall 019 and Regulator**





Figure 1-3. Royal Street Outfall 020 and Regulator

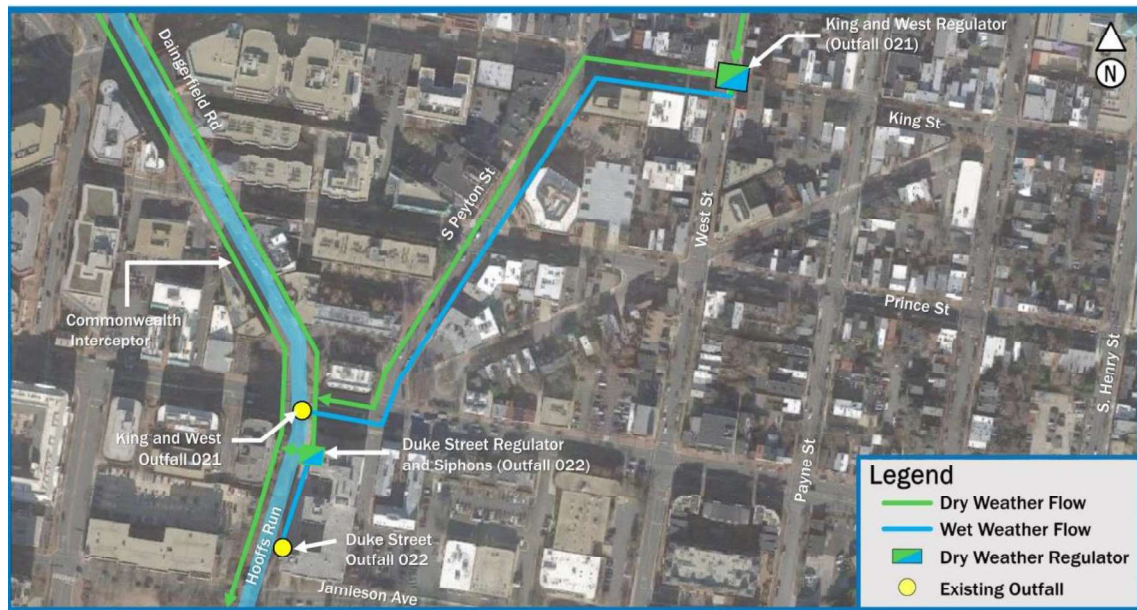


Figure 1-4. King & West Street Regulator Outfall 021 and Duke Street Regulator Outfall 022

## 1.4 VPDES Permit

Previously, the City held the Permit issued by VDEQ on August 23, 2013. Pursuant to the execution of the Outfall Transfer Agreement between the City and AlexRenew, VDEQ issued VPDES Permit VA0087068 to AlexRenew, effective September 1, 2018. On July 1, 2021, VPDES Permit VA0087068 was terminated, and the terms and conditions were incorporated into the 2021 permit reissuance for the AlexRenew WRRF as VPDES Permit VA0025160. This permit is effective from July 1, 2021 through June 30, 2026. As a part of the new combined permit, the CSO outfalls were renamed.

The new permit reassigned CSO outfall numbers as follows:

- Former CSO Outfall 001 is CSO Outfall 019;
- Former CSO Outfall 002 is CSO Outfall 020;
- Former CSO Outfall 003 is CSO Outfall 021; and
- Former CSO Outfall 004 is CSO Outfall 022.

## 1.5 Nine Minimum Controls

The City and AlexRenew share joint responsibility for CSS regulatory compliance under the *Amended and Re-stated Service Agreement, Exhibit D: Nine Minimum Controls (NMC) Agreement (2018)*. Activities for 2023 related to CSS operations and maintenance and the NMCs are as summarized below.

**Table 1-3. Summary of Nine Minimum Control Activities**

Minimum Control	Description	Responsible Party	Activity/Application
Operation and Regular Maintenance of the CSS	Regular sewer flushing	City/AlexRenew	<ul style="list-style-type: none"> <li>• Regularly scheduled flushing and inspections of sewer siphons, CSS trunk sewers, and known areas with high grease issues</li> <li>• 33,433 linear feet of sewer flushed and cleaned in CSO area</li> </ul>
	Regular Program of TV Inspection	City	<ul style="list-style-type: none"> <li>• Annual visual and CCTV inspection of CSS trunk sewers</li> <li>• 73,561 linear feet CCTV'd citywide, which includes 10,617 linear feet CCTV'd in CSO area</li> </ul>
	Regular annual catch basin cleaning program	City/AlexRenew	<ul style="list-style-type: none"> <li>• Critical areas cleaned weekly</li> <li>• Non-critical areas 2–3 times per year</li> <li>• 710 inlets and catch basins cleaned in CSO area</li> </ul>
Maximize Use of Collection System for Storage	Onsite Stormwater retention required in combined sewer area	City	<ul style="list-style-type: none"> <li>• Required for new development by City code</li> </ul>
Control of Non-domestic Discharges	Implement CSO controls to minimize impact of nondomestic discharges	City/AlexRenew	<ul style="list-style-type: none"> <li>• See Section 5</li> </ul>
Maximize Flow to the WRRF	Redevelopment Separation of CSS	City	<ul style="list-style-type: none"> <li>• 1300 King St. (1300 King St., 4-story building with -31 units). – sanitary separation, installation of green roof</li> </ul>
	Future Redevelopment of CSS	City	<ul style="list-style-type: none"> <li>• 802 N. Washington Street (Old Town Hotel, 5-Story Hotel with Under-ground Parking). – sanitary separation</li> <li>• 699 Prince Street (Hotel with 141 rooms, ground floor restaurant, and ground floor ballroom) - no separation, installation of green roof</li> <li>• 701 N Henry Street (701 N. Henry Street, 94 multi-family units) - sanitary separation and installation of Bio-retention</li> <li>• 101 Duke Street (101 Duke Street, 6 townhome units) – sanitary and storm separation</li> <li>• The Heritage at Old Town (450 &amp; 500 South Patrick St, 3 multi-family with 750 units) – installation of green roof and Bio-retention.</li> </ul>
Dry Weather Overflows (DWOs)	Diversion facilities inspected regularly & preventative maintenance	AlexRenew	<ul style="list-style-type: none"> <li>• Monthly flap gate and diversion chamber inspections</li> </ul>
	AlexRenew maintains a 24 hour on-call	AlexRenew	<ul style="list-style-type: none"> <li>• AlexRenew Maintenance department provides 24-hour on-call response</li> </ul>

Minimum Control	Description	Responsible Party	Activity/Application
	response team for reported DWOs		
Control of Solid and Floatable Materials in CSOs	Regular sewer flushing	City/AlexRenew	<ul style="list-style-type: none"> <li>See Section 8</li> </ul>
	Entrapment and Baffling Devices	City	<ul style="list-style-type: none"> <li>Using hooded catch basins in CSS area</li> <li>Using bar racks in CSO structures</li> </ul>
	Regular leaf season pickup	City	<ul style="list-style-type: none"> <li>Total collection of 18,990 cubic yards of leaves citywide which includes 1,415 cubic yards (382 tons) collected in CSO area</li> </ul>
	Regular catch basin cleaning	City	<ul style="list-style-type: none"> <li>See Section 8</li> </ul>
	Regular litter clean-up program	City	<ul style="list-style-type: none"> <li>Regular schedule for public litter cans, litter collection</li> </ul>
	Regular street sweeping program	City	<ul style="list-style-type: none"> <li>Regular schedule for street sweeping.</li> <li>Approximately 3,253 linear miles cleaned citywide, which includes 1,470 miles in CSO area</li> </ul>
Pollution Prevention	Industrial Waste Reduction	City/AlexRenew	<ul style="list-style-type: none"> <li>Encouraging industrial waste reduction through recycling and improved housekeeping</li> </ul>
	Street Cleaning and Litter Controls	City	<ul style="list-style-type: none"> <li>Regular street cleaning and litter collection</li> <li>See Control of Solid and Floatable Materials in CSOs</li> </ul>
	Hazardous Waste Recycling (HHW)	City	<ul style="list-style-type: none"> <li>Regular schedule for household hazardous waste day</li> <li>HHW and electronics recycling site is opened two days a week for residents to drop off</li> </ul>
	General Recycling and Solid Waste Control	City	<ul style="list-style-type: none"> <li>Regular recycling program</li> <li>Curbside single-stream recycling</li> </ul>
	Best Management Practices (BMPs) for Automotive Related Industries	City	<ul style="list-style-type: none"> <li>Program to promote BMP for automobile industries.</li> <li>Manual for automobile related industries for BMPs on City's website at <a href="https://alexandriava.gov/uploadedFiles/tes/info/Automotive_BMP_manual.pdf">al-alexandriava.gov/uploadedFiles/tes/info/Automotive_BMP_manual.pdf</a></li> </ul>
	Leaf Collection	City	<ul style="list-style-type: none"> <li>Regular program for seasonal leaf collection (see Appendix H)</li> <li>See Control of Solid and Floatable Materials in CSOs</li> </ul>
	Ordinances and Enforcement	City	<ul style="list-style-type: none"> <li>City Pollution Prevention Program</li> <li>City codes, summons and pre-payable fines related to pollution prevention</li> </ul>
	My City	City	<ul style="list-style-type: none"> <li>Internal reporting program includes "illicit discharges" as issue topic</li> </ul>
	Environmental Industrial Unit (EIU)	City	<ul style="list-style-type: none"> <li>Dedicated Code Enforcement Staff comprises the Environmental Industrial Unit that proactively inspects facilities and enforces the Environmental Crimes Ordinance</li> </ul>
Public Notification	CSO Public Notice	AlexRenew	<ul style="list-style-type: none"> <li>Public notice signs posted at CSO locations. Installations verified in 2023 that all are intact. See Section 10.</li> <li>Public information on CSS Collection System on City's website at <a href="https://www.alexandriava.gov/Sewers">https://www.alexandriava.gov/Sewers</a></li> <li>Public information on CSS Interceptors and Outfalls on AlexRenew's websites at <a href="https://alexrenew.com/how-we-clean-wastewater">https://alexrenew.com/how-we-clean-wastewater</a> and <a href="https://riverrenew.com">https://riverrenew.com</a></li> </ul>



Minimum Control	Description	Responsible Party	Activity/Application
Monitoring	Inspect outfalls	AlexRenew	<ul style="list-style-type: none"><li>AlexRenew has implemented a monitoring/inspection program for the CSS in accordance with Parts V.B.9 and V.C of its VPDES Permit</li></ul>





## Section 2 Combined Sewer Overflow Characterization

### 2.1 General

AlexRenew utilizes XPSWMM<sup>1</sup> to model the hydrology and hydraulics of the CSS network. Annual overflows from the CSO outfalls are estimated based on applying 15-min rainfall to the calibrated XPSWMM model. This section summarizes the 2023 rainfall recorded by the rain gauge maintained by the City at Mt. Vernon Elementary. As of March 21, 2024, NOAA’s rainfall data for Ronald Reagan National Airport (DCA), the usual source for rainfall data for the model, has not been issued. In lieu of the rainfall data from NOAA, the rainfall data from the City’s rain gauge was used to model the CSO Outfalls.

### 2.2 Summary of 2023 Rainfall Data

Rainfall data from the City for 2023 is summarized in Table 2-1.

**Table 2-1. Summary of 2023 Rainfall Events**

Total Number of Storm Events	Total Rainfall (inches)
100	35.13

During 2023, 100 storm events were recorded. A storm event is defined as rainfall equal to or exceeding 0.01 inches and separated by at least six continuous dry hours (“dry hours” is defined here to be six continuous hours of no measured rainfall). There was at least one measurable storm event every month during the calendar year. The presence of a storm event, however, does not necessarily mean the occurrence of a CSO.

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<sup>1</sup> XPSWMM is a commercially available software program that uses EPA’s Storm Water Management Model engine to estimate combined sewer overflows based on rainfall

## 2.3 Rainfall Data and Model Results for CSO Outfalls

Rainfall data and model results for 2023 are presented in Appendix A Tables A-1 through A-4 and summarized in Table 2-2. When multiple overflows that occurred during a single storm event, the overflow were characterized as a single overflow event. In 2023, the total estimated volume of overflow discharged from all the drainage areas in the CSS was 112 million gallons.

**Table 2-2. 2023 Rainfall and Overflow Model Summary**

Outfall <sup>2</sup>	Outfall Location Description	Rainfall Data for Storms Resulting in Overflows		Estimated Annual Volume of Overflow (MG)	Average Duration of Overflow (Hours)
		Number of Overflows (Occurrences)	Rainfall Contributing to Overflow <sup>1</sup> (inches)		
019	Pendleton St.	22	18.7	28	1.4
020	Royal St.	22	18.7	31	3.0
021	Duke St.	56	29.0	38	5.1
022	Hooffs Run	42	25.3	15	4.4

<sup>1</sup> For example, for a 1-inch storm, the first 0.15 inches of rain are conveyed to the WRRF. The rest of the rainfall cannot be conveyed to the plant and causes an overflow. Therefore, the amount of rain contributing to the overflow is 0.85 inches. This column represents the total amount of rainfall contributing to overflows for the entire year.

<sup>2</sup> Outfalls 001, 002, 003, and 004 were reassigned as 019, 020, 021, and 022 respectively, as of the issuance of VPDES Permit VA0025160. See Section 1.4 for more details.

Figure 1-1. shows that both Outfalls 021 and 022 serve the same drainage area, with Outfall 021 being located upstream from Outfall 022. As a result, most of the overflow volume associated with this drainage area (King and West) primarily occurs at Outfall 021. Consequently, Outfall 022 has a notably lower volume of overflow, as indicated in Table 2-2.

Twenty-seven years of modeled results (1997 through 2023) are summarized and presented in Table 2-3. Table 2-3 features annual data for the total recorded rainfall that caused CSOs to occur, the predicted average estimated overflow volume, and average cumulative overflow duration per event. For 2023, based on averages from each outfall, an average total of approximately 3.7 million gallons (MG) was estimated to be discharged from the CSS during each overflow event. Each overflow event had an average cumulative duration of about 3.5 hours, based on the average duration for each outfall.

**Table 2-3. Average CSS Performance**

Year <sup>3</sup>	Total Recorded Rainfall (inches)	Average Estimated Overflow Volume (MG) <sup>1</sup>	Average Cumulative Duration (hours) <sup>2</sup>
1997	33.82	2.1	3.2
1998	35.94	2.1	3.4
1999	40.35	3.8	3.4
2000	38.59	2.3	2.7
2001	29.95	2.0	2.8
2002	33.17	2.0	3.2
2003	59.12	3.3	3.4
2004	42.36	3.8	3.6
2005	41.63	4.9	5.2
2006	46.99	5.4	4.2
2007	32.94	2.7	5.0
2008	46.04	4.6	4.2
2009	45.34	2.1	3.4
2010	39.69	3.2	6.8
2011	45.70	3.5	5.3
2012	32.06	2.8	3.5
2013	44.30	3.2	4.3
2014	42.73	2.5	5.9
2015	44.16	3.8	2.9
2016	31.55	1.7	3.4
2017	35.65	3.2	4.8
2018	66.60	6.1	4.6
2019	42.72	3.2	3.6
2020	57.78	5.7	4.4
2021	44.25	5.4	3.8
2022	43.88	4.3	3.7
2023	35.13	3.7	3.5

<sup>1</sup> The sum of each CSO outfalls estimated overflow volumes in Table A-5.

<sup>2</sup> The average cumulative duration is calculated by summing the average amount of time that overflows occurred at CSOs 019 through 022 and dividing it by 4.

<sup>3</sup> CSS performance results from 1997 through 2017 were provided by the City of Alexandria. The 1997 through 2017 climate period was not rerun using the latest 2018 calibrated XPSWMM model.

## 2.4 Summary of Model Updates

The XPSWMM model has been recalibrated against multiple years of flow meter data at each CSO outfall as well as many points throughout the CSS and in the separate part of the sanitary sewer system. There was no need to update the model in 2023.



## Section 3 Operations and Regular Maintenance Programs

AlexRenew and the City's Department of Transportation and Environmental Services (T&ES) are responsible for proper operations and maintenance (O&M) of the CSS and for demonstrating compliance with the NMCs. Previous studies and assessments showed that the CSO discharges did not preclude attainment of existing water quality standards.

The City transferred CSO outfalls and associated control structures to AlexRenew via the Outfall Transfer Agreement between the City of Alexandria, Virginia, and AlexRenew, dated May 1, 2018. The agreement includes specific provisions that define roles, responsibilities, and processes to implement and operate the facilities proposed in the Long-Term Control Plan Update (LTCPU). VDEQ approved the City's outfall transfer on June 29, 2018.

### 3.1 Inspection and Maintenance of CSS

Inspection of all outfalls, tide gates, diversion and regulator structures within the CSS are required under Part V.B.1.b of the existing Permit. AlexRenew and the City have implemented guidelines for inspecting the various elements of the CSS, including the four permitted CSO outfalls, tide gates at Royal Street (Outfall 020) and Hooffs Run (Outfall 022), and diversion structures at the Duke Street and Hooffs Run outfalls (Outfalls 021 & 022). Inspection and maintenance of diversion and regulator structures, and tide gates occur at least monthly, while dry weather outfall (DWO) inspections occur twice a month. The results of these inspections during 2023 are documented and the corresponding forms are included in Appendix B.

### 3.2 Preventive Maintenance

AlexRenew and the City continue to practice an extensive program of sewer system preventive maintenance. Focusing on preventive maintenance has helped AlexRenew and the City reduce the need for corrective and emergency maintenance. AlexRenew and the City's current preventive maintenance program includes the following activities:

- Monthly problem area grease flushing
- Flushing of the sanitary sewers, storm sewers, and combined sewers in the CSS
- Internal sewer CCTV inspections
- Inlet and catch basin cleaning
- Sweeping and cleaning of the streets

The activities performed under the preventive maintenance program help maintain the hydraulic capacity of the CSS in addition to maximizing the storage capacity of the collection system. Included in the Appendices of this report are the O&M records documenting the individual preventive maintenance activities for the sewer system, including the area within the CSS.

### 3.3 Training

AlexRenew and the City conduct periodic training programs in work and safety procedures related to the operation and maintenance of the CSS. The staff training records can be found in Appendix D.

### **3.4 Allocation of Funds for Operation and Maintenance**

AlexRenew and the Sewer Maintenance Section of T&ES are responsible for O&M of the CSS. Specific information regarding AlexRenew's and the City's current and ongoing funding of operation and maintenance of the CSS are summarized in Appendix C

## Section 4 Maximize Use of Collection System for Storage

Measures implemented by AlexRenew and the City to maximize storage within the CSS to retain wet weather flow are summarized as follows:

- CSO diversion structures are designed to permit filling of the trunk sewers to at least three (3) times dry weather flow (DWF) before overflow occurs.
- Storm and sanitary sewers are flushed on a regular basis to remove accumulated sediment to maximize sewer capacity and diversion structure capacity. City maintenance records documenting sewer flushing and cleaning activities are included in Appendices F and G.

## Section 5 Control of Non-Domestic Discharges

AlexRenew administers and implements an industrial pretreatment program under its VPDES Permit. In 2001, the City developed a revised ordinance for environmental offenses. The ordinance is included in Appendix I. Also included in Appendix I is the City ordinance dealing with requirements for discharging to the AlexRenew WRRF.

AlexRenew has not identified any Significant Industrial Users (SIUs) or remediated dischargers within the CSS through its pretreatment program.

## Section 6 Maximize Flow to the Water Resource Recovery Facility

The objective of this minimum control, based on EPA's NMC guidance, is to reduce the magnitude, frequency, and duration of CSO discharges by maximizing flows to the Publicly Owned Treatment Works (POTW). The POTW is the WRRF that is owned, operated, and maintained by AlexRenew and is regulated under VPDES Permit VA0025160. During wet weather conditions, the wastewater treated at the WRRF is increased to the maximum rate that can be handled to provide complete treatment. Normally, the WRRF increases treatment flow from a dry weather range of approximately 35 MGD to more than 100 MGD during wet weather events.

Various sewer separation projects have been implemented, covering multiple Permit cycles, which increase the flow directed to the WRRF. These projects are as follows:

- The Tanyard Ditch Relief Storm Sewer Project, completed in 2007, featured installing a new storm sewer within the CSS area and relocating the existing combined sewer. The drainage area associated with the new storm sewer was removed from the CSS as the new storm sewer discharges to the Potomac River. Approximately 11.5 acres in the Royal Street CSS Area were separated.
- Approximately three (3) city blocks in the Pendleton Street CSS area were either partially separated (sanitary sewerage removed from the CSS area) or completely separated (storm and sanitary sewers no longer contribute to the CSS) as part of the Madden Homes/Chatham Square redevelopment project completed in 2007. The stormwater was diverted to existing stormwater outfalls. A sanitary sewer on Pendleton Street was constructed to receive separated wastewater flows and convey the flow to the Potomac Interceptor downstream of Outfall 019. A total of approximately 13 acres were separated.
- Two areas in the King and West Sewershed were redeveloped in the CSS area with sanitary flows redirected to the Potomac Yard Trunk Sewer, which connects directly to AlexRenew. The separation project was completed in 2008. Previously, these areas discharged to the combined sewer. The redeveloped areas include the following:
  - 1115 Cameron Street
  - 500 N. Henry Street
- The Wythe Street sewer separation project was completed in the summer of 2010 as part of a redevelopment project in the King and West combined sewer area. One thousand linear feet of pipe was installed using trenchless technology along Wythe Street between N. Fayette Street and N. Alfred Streets. The project resulted in 1.44 acres separated and removed from the combined sewer service area.
- In 2014, two projects associated with the Area Reduction Plan completed construction. The Harris Tee-ter development along Madison Street between N. Saint Asaph Street and N. Pitt Street separated and removed approximately 1.5 acres of sanitary sewage from the combined sewer service area. The James Bland Phase II development located in the Braddock East area separated and removed approximately 3.2 acres of sanitary flow from the combined sewer service area.
- In 2016, the Payne and Fayette Separation Projection was completed. This project consisted of five sites along Payne Street and Fayette Street that removed sanitary flows from the King and West area and directed them into the Potomac Yard Trunk Sewer. As a result of the project, 8.3 acres of sanitary sewer has been separated from the CSS Area.
- In 2017, the Mill development project completed construction at 513 and 515 North Washington Street. The project featured renovation of an existing commercial building and construction of a new structure where a parking lot once occupied the space. As a result of the project, 0.51 acres of sanitary sewer has been separated from the CSS Area.

- In 2018, The 700 N. Washington St and 530 First St redevelopment projects were completed. Both projects included sewer separation and the 530 First St project also included a green roof.
- In 2019, The 601 N. Henry Street redevelopment project was completed. This project included separation of the sanitary sewer from the CSO area.
- In 2020, AlexRenew completed the 108 to 116 MGD Expansion Project. This upgraded the primary pumping capacity at AlexRenew Water Resource Recovery Facility to accommodate additional wet weather flows.
- In 2021, two projects associated with the CSO and CSS were completed:
  - ARHA Ramsey Homes at 699 N. Patrick Street. This project included separation of the sanitary sewer from the CSO area.
  - Sunrise Senior Living at 400 N Washington St. This project included offsite sanitary separation.
- In 2022, 600 N. Royal St. (Royal Street Bus Garage, Multifamily residential -276 units) was completed. This project included sanitary and storm separation.
- In 2023, two projects were completed and are listed as follows:
  - 1101 N. Washington (Abingdon Place, Existing Hotel Redeveloped into 19 Townhomes). This project included no sanitary separation and installation of a green roof.
  - 1300 King Street (1300 King Street, 4-story building with 31 units). This project included separation of the sanitary sewer and installation of a green roof.

The City continues to periodically identify specific areas that can be separated as future development opportunities arise.

## Section 7 Dry Weather Overflows

In 2023, AlexRenew conducted a dry weather overflow (DWO) inspection program to monitor dry weather overflows. In accordance with Part V.B.1.b of the existing Permit, AlexRenew inspects each CSO outfall (Outfalls 019-022) at least twice per month and documents each occurrence as to the presence of DWO's. The 2023 DWO inspection forms, for Outfalls 019-022, are in Appendix B. In 2023, there were no reported instances of DWOs.

## Section 8 Control of Solid and Floatable Material in CSOs

Measures implemented to control solid and floatable material in CSOs are summarized as follows:

- Regular street and catch basin cleaning
- Regular sewer flushing to prevent buildup of solids
- Regular leaf collection and litter removal
- Use of hooded (inverted outlets) catch basins to retain solids and floatables

The City follows a regular street sweeping schedule to remove trash and litter in the streets and alleys that may otherwise be washed into the CSS. The City sweeps all the streets in the CSS area at least once per week. Some areas are cleaned daily, Monday through Friday. Copies of the forms documenting the City's street sweeping activities are included along with the other activity reports in Appendix E.

Additionally, overflow screens are installed in the outfall tide gate chamber downstream of the Royal Street CSO regulator to prevent floatable materials from discharging into Hunting Creek. AlexRenew and the City also routinely perform sewer flushing, as well as inlet and catch basin cleaning within the CSS. Copies of these maintenance reports are also included in Appendices F and G, respectively.



## Section 9 Pollution Prevention

Pollution prevention programs and ongoing activities performed by the City are summarized as follows:

- Leaf collection
- Hazardous waste recycling
- General single-stream recycling and solid waste control
- Street cleaning and litter control
- BMP manual for automotive related industries. All businesses that require a Special Use Permit (SUP) comply with this manual by placing appropriate conditions on their SUPs. A copy of the City's BMP handbook can be downloaded at [http://alexandriava.gov/uploadedFiles/tes/info/Automotive\\_BMP\\_manual.pdf](http://alexandriava.gov/uploadedFiles/tes/info/Automotive_BMP_manual.pdf).
- Work release: T&ES uses work release crews under the general supervision of the Sheriff's Office to perform general clean-up and related projects that benefit the community.
- Aggressive illicit discharge detection and elimination system program with dedicated Code Enforcement staff as the Environmental and Industrial Unit (EIU).
- "My City" internal reporting program includes "illicit discharges" as part of the issue topics.

A copy of information regarding the leaf collection program that is made available to all City residents is included in Appendix H.

## Section 10 Public Notification

In 2018, new signage was created and posted at each of the CSO outfalls notifying residents of the hazards of swimming and waterborne illness. Signs were updated to include the AlexRenew logo and contact information. All signage was updated in 2024. These signs are posted in both English and Spanish and follow standard regulation for size and color. Recent photographs taken of the CSO warning signs are provided on the following pages in Figure 10-1, Figure 10-2, Figure 10-3, and Figure 10-4.



Figure 10-1. Public Notice Sign at Pendleton Street Outfall 019



Figure 10-2. Public Notice Sign at Royal Street Outfall 020



Figure 10-3. Public Notice Sign at Hooffs Run



Figure 10-4. Public Notice Sign at Duke Street and Hooffs Run Outfalls 021 & 022

## Section 11 CSO Monitoring

The previous CSS permit required the permittee to monitor pollutants of concern at each CSS outfall to characterize CSO impacts and the efficacy of CSO controls. The volume of CSO monitoring data collected over previous permit terms has allowed the permittee to fully characterize the CSOs. During the term of this permit, AlexRenew commenced construction for the RiverRenew Program. The aggressive construction schedule does not allow AlexRenew staff to safely access the overflow points at all times during construction. As such, CSO monitoring was suspended for the term of the permit. During the RiverRenew Program construction phase, AlexRenew will continue to provide updates on NMC activities and modeled overflows in lieu of CSO monitoring.

## Section 12 Implementation of Long-Term Control Plan Update

### 12.1 General

On June 29, 2018, VDEQ approved the LTCPU, jointly prepared by AlexRenew and the City. The LTCPU recommended a solution to remediate Alexandria's four existing combined sewer outfalls and featured a unified tunnel system coupled with upgrades to AlexRenew's WRRF to capture and treat combined sewer discharges.

Following approval of the LTCPU, AlexRenew and the City executed an Outfall Transfer Agreement that transferred the existing combined sewer system outfall assets to AlexRenew, which was approved by City Council on June 26, 2018. The agreement assigned ownership of the four existing combined sewer system regulators and outfalls to AlexRenew. Additionally, the agreement made AlexRenew solely responsible for the regulatory compliance responsibilities associated with the outfalls, including the planning, design, and construction of the recommended LTCPU plan.

On September 1, 2018, VDEQ recognized the transfer of the existing combined sewer system assets by issuing VPDES Permit VA0087068 to AlexRenew. VPDES Permit VA0087068 was terminated in July 2021, and the terms and conditions were incorporated into the 2021 permit reissuance for the AlexRenew WRRF as VPDES Permit VA0025160. A condition of the permit requires AlexRenew to report on the progress of the implementation of the recommended LTCPU plan by November 1<sup>st</sup> of each year.

### 12.2 RiverRenew Projects

While the LTCPU provided the conceptual framework to comply with the legislative requirements associated with the 2017 Virginia Law, it did not provide detailed project definition and procurement needs. Therefore, the first major task following the LTCPU approval was to succinctly define each project, establish methods and protocol for the procurement of each project, develop detailed schedules, and plan for the availability of sufficient space at AlexRenew's constrained WRRF site. The process identified four major RiverRenew projects with a capital cost of \$615 million that include:

- **Tunnel Project.** 12-foot diameter, 2-mile-long, storage and conveyance tunnel; 6-ft diameter, 0.5-mile-long conveyance sewer; 20-million-gallon-per-day tunnel dewatering pumping station; 180-million-gallon-per-day wet weather pumping station; and wet weather treatment.
- **WRRF Site Security and Access Project.** Upgrades to AlexRenew's existing access points and site security system to accommodate Tunnel System construction traffic at the WRRF.
- **108 to 116 MGD Expansion Project.** Upgrades to AlexRenew's primary pumping capacity at the WRRF to accommodate additional wet weather flows.
- **Building J Facilities Relocation and Decommissioning Project.** Relocation of facilities including the WRRF laboratory, chiller system, and instrumentation and controls system; and decommissioning of AlexRenew's former administrative building to provide space for the Tunnel System's construction.

### 12.3 Implementation Progress

AlexRenew has made significant progress on the implementation of the Project in 2023, which is illustrated in Table 12-1, and is currently 66% complete. Like most large infrastructure initiatives underway across the country, the project has been unable to avoid the long-term negative impacts of the COVID-19 pandemic and the war in Ukraine. These global events continue to cause supply chain issues and unprecedented inflation, hindering the ability to efficiently procure necessary resources to support construction activities. The Design-Builder developed and submitted an initial recovery schedule in September 2022 and a second recovery



schedule in January 2023. Due to these delays, the Tunnel Project is projected to be 90 days behind schedule. The delay will primarily impact scheduled work at the AlexRenew site. Legislation introduced during the 2024 Virginia General Assembly to extend the project's statutory deadline by one year to July 1, 2026, was passed in the Virginia State House and Senate.

The Tunnel Project work is currently under construction at four distinct construction staging areas, that include AlexRenew’s WRRF, Pendleton Street (Outfall 019), Royal Street (Outfall 020), and Hooffs Run (Outfalls 021 and 022). A construction staging area (CSA) is a physical area of land designated for Traylor-Shea to occupy and construct the proposed facilities. The design process for all components was concluded at the start of 2023. As of the date of this report, the TBM has completed mining the tunnel. Table 12-1 summarizes the major milestones reached this year and percent complete for design and construction work.

**Table 12-1. Progress and Milestones for the Tunnel Project as of December 31, 2023**

Staging Area or Component	Proposed Facilities	Major Milestones	Percent Complete
AlexRenew	35- and 65-foot diameter shafts; 20 and 180 MGD pumping stations; superstructure	Pumping station internal structures construction ongoing Pumping shaft concrete liner and base slab completed Outfall 004 overflow structure construction ongoing	22%
Pendleton Street	35-foot diameter shaft; diversion chamber; overflow structure	Shaft excavation and base slab completed  Excavation for near surface structures ongoing Permanent concrete structures construction and deep foundations (pile driving) ongoing	50%
Royal Street	37-foot diameter shaft; diversion chamber	Excavation for near surface structures ongoing Permanent concrete structures construction and deep foundations ongoing	28%
Hooffs Run	0.5-mile-long, 6-foot diameter sewer interceptor; diversion chamber	Junction chamber and diversion chamber construction ongoing Open-cut construction ongoing Sheeting removal at African American Heritage Park ongoing	63%
Waterfront Tunnel	2-mile-long, 12-foot diameter tunnel constructed by tunnel boring machine (TBM)	Tunnel complete at 11,377 feet (as of March 13, 2024)	100%

A summary of progress made through 2023 for permit agency coordination is summarized in Table 12-2.

**Table 12-2. Permit Progress and Milestones for RiverRenew as of December 31, 2023**

Permit (Agency)	2023 Progress and Milestones
National Park Service (NPS) Permits	<ul style="list-style-type: none"> <li>No NPS Permits issued in 2023</li> </ul>
VPDES Permit (VDEQ)	<ul style="list-style-type: none"> <li>No VDEQ Permits issued in 2023</li> </ul>
Joint Permit Application (VMRC, USACE, VDEQ)	<ul style="list-style-type: none"> <li>On May 26, 2023, VMRC extended authorization for RiverRenew impacts through May 31, 2028.</li> </ul>
City of Alexandria	<ul style="list-style-type: none"> <li>On January 3, 2023, the COA issued a Noise Variance Permit for construction activity associated with Hooffs Run Interceptor construction.</li> </ul>



Permit (Agency)	2023 Progress and Milestones
	<ul style="list-style-type: none"> <li>On February 8, 2023, the COA issued a Noise Variance Permit for construction of the new Outfall 003 extension box culvert.</li> <li>On March 17, 2023, and June 17, 2023, the COA issued Noise Variance Permits for construction activities at the Pendleton Street construction site.</li> <li>On June 1, 2023, the COA issued a Noise Variance Permit for TBM maintenance activities at the Royal Street construction site.</li> <li>On October 19, 2023, the COA issued a Noise Variance Permit for bypass pumping operations associated with Hooffs Run Interceptor construction.</li> <li>Over 30 COA construction permits and plan approvals were issued in 2023 that enabled construction to progress at the WRRF and all outfall sites.</li> </ul>

The three other RiverRenew projects reached major final project milestones in 2021. There were no additional updates to the projects listed below in 2023.

**Table 12-3. Implementation Progress and Milestones for RiverRenew as of December 31, 2023**

Project	2023 Progress and Milestones
108-116 MGD Expansion	<ul style="list-style-type: none"> <li>Reached Final Completion December 2020</li> </ul>
Building J Facilities Relocation and Decommissioning	<ul style="list-style-type: none"> <li>Reached substantial completion in May 2021 with the demolition of the existing building and substructure.</li> </ul>
WRRF Site and Security	<ul style="list-style-type: none"> <li>Reached Final Completion in May 2021</li> </ul>

## 12.4 Long-Term Control Plan Update Public Notification and Participation

In 2023, AlexRenew continued its digital programming efforts and developed 15 videos and two (2) character animations covering a range of topics including updates on construction at AlexRenew’s WRRF related to the RiverRenew Tunnel System Project underway. These videos were shared through [RiverRenew.com](https://riverrenew.com) and AlexRenew’s social media channels.

Many of these videos were coordinated with more in-depth program updates on the RiverRenew website (<https://riverrenew.com/program-updates/>) to create a central hub for the community to stay engaged on current program progress. Website updates and social media highlights were compiled into the Program’s quarterly e-newsletter, “The River Renewer,” and distributed via email to a group of over 400 recipients composed of community members and other stakeholders.

In January 2021, the Council-Board Workgroup meetings reconvened virtually, after a pause during the pandemic, and reconvened in-person in 2022. Four Council-Board Workgroup meetings were held in 2023. The group continues to serve as a liaison to review program progress, costs, and financing to minimize community impacts and maximize community benefits.

To help engage younger Alexandrians, AlexRenew introduced Cloe the Tunnel Boring Machine in 2020, with the addition of new characters as work on the project progressed. In 2023, AlexRenew released the second in a series of children’s storybooks titled “The Backhoe Brothers Dig Deep!” The storybook was issued in digital format in September 2023.



To manage long-term Program debt, AlexRenew's Board of Directors approved the third rate-adjustment in June 2023 for fiscal years 2024 and 2025. This approved rate adjustment included an increase to existing wastewater treatment rates by 5.4 percent on July 1, 2024, and by 5.1 percent on July 1, 2025. This equates to about \$3 per month for each of these increases or an average increase of about \$36 per year for the average residential customer. AlexRenew's outreach campaign for the rate adjustment in 2023 included sharing information on AlexRenew's website, in bill stuffers, a Public Hearing, and through social media and a press release.

## 12.5 RiverRenew Stakeholder Advisory Group Update

In September 2020, Alexandria City Council passed a resolution for the establishment of the 2021-2022 RiverRenew Stakeholder Advisory Group (SAG). This group is tasked with monitoring construction progress on the Tunnel System Project. The SAG consisted of eight (8) members that represent neighborhoods, businesses, and environmental groups who commit to being active and engaged in the stakeholder process.

In December 2021, the City Council extended the SAG term by one year, through January 2023, with an option to extend for two additional years. Consequently, on January 10, 2023, the SAG term was extended by an additional year. AlexRenew continued engagement with the RiverRenew Stakeholder Advisory Group and City-Council-AlexRenew Board Workgroup, which met five (5) and three (3) times throughout 2023, respectively.

The Stakeholder Advisory Group was reconstituted under the AlexRenew Board of Directors in February 2024.

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