



2019

## Annual Performance Report

Roanoke River Waste Treatment Plant NC0024201 &  
Collection System WQCS00027

### Abstract

The Annual Performance Report provides key performance information that demonstrates the POTW's accountability to ensure Roanoke Rapids Sanitary District's stewardship and prosperity by addressing its environmental, operations, and maintenance challenges through transformative process and technology solutions.

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I. General Information:

A. Regulated entity: Roanoke Rapids Sanitary District, Collection Systems (C.S.) and Wastewater Treatment Plant (WWTP), together Publicly Owned Treatment Works (POTW)

B. Responsible entity: Roanoke Rapids Sanitary District, Dan Brown, CEO  
PO Box 308  
Roanoke Rapids, NC 27870  
Phone: 252-537-9137

C. Person in charge/contact

1. C.S.: David Warren Scott, Operator in Responsible Charge (ORC)  
Eric Wes Deaton, Back-up ORC  
Roanoke Rapids Sanitary District, Distribution & Collection  
425 East 11<sup>th</sup> St.  
Roanoke Rapids, NC 27870  
Phone: 252-537-9747

2. WWTP: Steven L Ellis, Operator in Responsible Charge (ORC)  
Timothy Skipper, Back-up ORC  
Roanoke River Wastewater Treatment Plant  
135 Aqueduct Road  
Weldon, NC 27890  
Phone: 252-536-4884

D. Applicable Permit(s)

1. C.S.: North Carolina Environmental Management Commission System-wide Wastewater Collection System Permit No. WQCS00027
2. WWTP: National Pollution Discharge Elimination System (NPDES): NC0024201  
Land Application (L.A.): WQ0001989  
Stormwater (General): NCG110000

E. Description of C.S.:

The collection system consists of approximately 146 miles of sewer lines and six lift stations that serve Roanoke Rapids, Gaston, and portions of Halifax and Northampton Counties; which encompasses an approximate population of 17,600. The sewer lines within Roanoke Rapids, Gaston and all sub-divisions; which connect to two main Interceptors, range in size from 8" to 12". There are two main 30" diameter Interceptors transporting wastewater to the WWTP.

The Roanoke River Interceptor collects wastewater from basins located on the north side of the Sanitary District. The Gaston basin and Northampton County are also served by this interceptor. The Interceptor begins just west of 100 Gaston Road (NC HWY 48) in Roanoke Rapids. There are 3 primary basin pump stations and 2 secondary pump stations served by the interceptor whose pipe sizes range from 18" to 30".

The Chockoyotte Creek Interceptor serves the south side of the Sanitary District and three sub-divisions located outside the Roanoke Rapids city limits; Lake View Park, Greenbriar, and Lincoln Heights. The Interceptor begins adjacent to 1100 Zoo Road. There is one primary basin pump station along the route served by the interceptor whose pipe sizes range from 12" to 30".

The system has six sewer lift stations. Three stations are in the Gaston basin. HWY 46 Pump Station serves a Northampton County School, Old Emporia Road Pump Station serves the Chowan Housing Projects and the Hwy 48 Pump Station pumps all flows from Gaston and Northampton County via an 8" force main suspended from the NC HWY 48 Bridge spanning the Roanoke River to the Roanoke River Interceptor. The remaining three pump stations are located within Roanoke Rapids basins and serve residential and some light commercial customers. Two of the stations, Belmont and Poplar Springs, discharge to the Roanoke River Interceptor while the Greenbriar Pump Station discharges to the Chockoyotte Creek Interceptor.

F. Description of WWTP:

The wastewater treatment plant is rated at 8.34 million gallons per day (MGD). Peak flow is rated at 12.5 MGD.

Treatment processes at the wastewater plant include grit and rag removal. This is followed by primary clarification, trickling filter biological secondary treatment, activated solids treatment, secondary clarification, final effluent chlorination/dechlorination processes, and final pH adjustment.

During these processes solids are removed from two locations. Primary clarification removes settleable solids from incoming wastewater to an anaerobic digestion unit. Here the solids, in the absence of oxygen, receive pH adjustment, mixing, and heating to produce a stabilized material. Once the solids are stable, excess water is decanted and returned to the plant for further treatment. The stabilized, thickened solids are treated with lime for odor control then removed to a holding tank to await land application.

Secondary clarification removes solids from the activated solids process. Here, solids in the presence of oxygen, pH control, and mixing, accumulate in excess. They are removed, chemically stabilized, and added to a holding facility. All stabilized solids are analyzed and land applied according to their nutrient value, ceiling and accumulative requirements.

There are two pumping stations in the wastewater plant distributing wastewater into and through the plant. They are the Influent Pump Station and the Trickling Filter Effluent Pump Station. The Influent Pump Station has the capacity to pump 20 MGD and the Trickling Filter Effluent Pump Station 27 MGD. In conjunction with these two pump stations there is the Emergency Flood Pump Station with a capacity of 21 MGD to remove treated effluent from the plant during high river stages which prevent normal gravity flow discharge. Also, a storm water pump station has been installed. This station intercepts site runoff, an unnecessary treatment load and potential site flooding condition, and removes it before entry to the plant. It has the capacity to pump 11.5 MGD. Numerous other pumps and mixers are located throughout the plant for process control.

## II. Performance:

### 1. C.S:

The performance of the system in 2019 was very good. There were no permit violations or monitoring and reporting violations. The District's Fat, Oil, and Grease (FOG) Program performed 43 inspections of area restaurants and food preparation facilities (FSE). There were no notices of violation. All FSE were advised to continue following "Best Management Practices" and maintain maintenance records. The District FOG program sent out billing inserts on FOG information throughout the year continuing our public education program. There were no Sanitary Sewer Overflows (SSO) out of eight total SSOs during the period attributed to FOG in 2019.

The District contracted with USDA wildlife services for outfall cutting from Chockoyotte Creek located adjacent to its interceptor. This ongoing work improved access to the interceptor and helped minimize flooding of manholes along the easement.

The District also contracted with Freese and Nichols & Hydro Structures to install flow meters in five locations around Roanoke Rapids. Hydro Structures also did a manhole inspections condition assessment on Manhole K-248 in Basin K and pipe condition assessments throughout Basin K.

## 2. WWTP:

Over the course of 2019, the Roanoke River Wastewater Plant operated very efficiently. There were no permit violations or monitoring and reporting violations. The plant flows ranged from a daily maximum of 11.4 Million Gallons per Day(MGD) to a minimum of 1.8 MGD. The average daily flow was 3.2 MGD. The plant treated 1,317,800,000 gallons of wastewater throughout the year; which was discharged to the Roanoke River.

During 2019, there was one plant bypass of treatment units in which 35,343 gallons of Wastewater with some biological treatment was bypassed to the Roanoke River. There were two times during the year when flows were increased due to heavy rains. During these times, flow was equalized to the equalization basins to lower peak flows through the plant. Throughout 2019, 1,706,811 gallons of wastewater was equalized and later returned to the plant for treatment. The efforts to repair the collection system and reduce Inflow and Infiltration from prior years continued in 2019. This work has led to lower peak flows and reduced the number of bypasses from the plant as illustrated in the following table:

| Year                  | 2015  | 2016  | 2017  | 2018 | 2019 |
|-----------------------|-------|-------|-------|------|------|
| Max Day (MGD)         | 11.4  | 17.3  | 8.2   | 9.0  | 11.4 |
| Avg. Daily Flow - MGD | 3.80  | 3.62  | 2.96  | 3.34 | 3.24 |
| Estimated I & I - MGD | 2.05  | 1.76  | 1.06  | 1.54 | 1.48 |
| Annual Rainfall - in. | 47.93 | 49.99 | 41.33 | 60.5 | 46   |

The following table illustrates the treatment performance of the wastewater plant and its ability to meet and exceed the NPDES permit requirements:

| PARAMETER          | MONTHLY LIMIT | WEEKLY LIMIT | REQUIRED REMOVAL | ANNUAL REMOVAL | ANNUAL AVERAGE | DAILY MAX     | DAILY MIN |
|--------------------|---------------|--------------|------------------|----------------|----------------|---------------|-----------|
| CBOD               | 25mg/L        | 37.5mg/L     | 85%              | 96.2%          | 8.0mg/L        | 17.6mg/L      | 4.0mg/L   |
| TSS                | 30mg/L        | 45mg/L       | 85%              | 91.2%          | 16.6mg/L       | 56mg/L        | 6.7mg/L   |
| Fecal Coliform     | 200 Colonies  | 400 Colonies | N/A              | N/A            | 32 Colonies    | >792 Colonies | 1 Colony  |
| NH <sub>3</sub> -N | N/A           | N/A          | N/A              | N/A            | <2.8mg/L       | 8.4mg/L       | <0.5mg/L  |
| Total-N            | N/A           | N/A          | N/A              | N/A            | <13.6mg/L      | 18.6mg/L      | 7.1mg/L   |
| Total-P            | N/A           | N/A          | N/A              | N/A            | 1.03mg /L      | 1.70mg/L      | 0.58mg/L  |

The Wastewater Treatment Plant relies on anaerobic digesters for primary sludge stabilization. In 2019, the original sludge heater for digester number 1 that was installed in 1965, was replaced with new heater. The new heater is safer and more efficient. Also in 2019, the parts to update the heater for digester number 3 were ordered to make both heaters alike. The work on heater number 2 should be completed in early 2020. Digester number 2 was cleaned out and inspected in

2019 along with having the steel floating top removed, blasted, and recoated to preserve and extend its useful life. Furthermore, a new waste gas burner was ordered and received that will automatically control the methane gas system pressure for the digester heaters. This will prevent the wasting of methane gas and the release of unburned methane gas into the atmosphere. The new burner will be installed in January of 2020.

There are 1985.46 acres of applicable land currently permitted through the District's Land Application Permit. During 2019 there were 2,609,393 gallons, or 559.29 dry tons of biosolids applied to 209.53 acres. There were no permit violations for the land application program in 2019.

A. Permit limit violation

1. C.S.: None
2. WWTP: None

B. Monitoring and Reporting Violations

1. C.S.: None
2. WWTP: None

C. 2019 Sanitary Sewer Overflows

1. C.S.: There were 8 reportable SSO's in 2019.
  1. Manhole 138 at 1<sup>st</sup> & Franklin St., 1,200 Gal.
  2. Manhole 11 2<sup>nd</sup> & Franklin St., 1,800 Gal.
  3. Manhole 52 at 3<sup>rd</sup> & Rapids St., 5,400 Gal.
  4. Manhole 46 at 3<sup>rd</sup> & Starke Dr., 12,600 Gal.
  5. Manhole 54 on Land St., 14,400 Gal.
  6. Manhole 54 on Land St., 900 Gal.
  7. Manhole 46 3<sup>rd</sup> & Starke Dr., 2,100 Gal.
  8. Manhole 27 NC Hwy 48 near Rightmeyer Machine Rentals., 900 Gal.

There was an estimated total of 39,300 gallons spilled in SSO's in 2019. These spills are the result of capacity exceedance due to wet weather conditions. This correlates to 5.47 spills per 100 miles of pipe down from a 5-year high in 2014 of 15.07 spills per 100 miles of pipe.

2. WWTP: N/A

D. Bypass of Treatment Facility

1. C.S.: N/A

2. WWTP: There was one bypass at the Wastewater Treatment Plant in 2019.

E. Description of any known environmental impact or violations.

1. C.S.: None
2. WWTP: None

F. Description of corrective measures taken to address violations or deficiencies.

1. C.S.: Along with the wildlife control, FOG program and outfall clearing discussed above, RRSd continues to perform preventative sewer backup maintenance by cleaning with Jetter and Root Cutter; which is attached to the Jetter hose, followed by Closed Circuit TV (CCTV) camera to inspect the lines after cleaning. The District also uses its Vac-con Truck, which cleans the line more effectively and proves to be more reliable than the old unit. The District also continues to use the Rausch CCTV van purchased in 2018 extensively.

District employees completed three Sanitary Sewer Point Repairs in 2019. The locations were 1304 Roanoke Ave, 1505 Murphey St, and 524 NC Hwy 125.

District employees completed 14 total new replacement taps in 2019. Eleven of which were 4" replacement taps throughout the district service area.

District employees cleaned 23.30 miles of sewer lines and CCTV'd all suspect problem areas.

District employees utilized the District's excavator mounted flail mower in conjunction with NC Wildlife Solutions LLC to cut and clear 16.88 miles of interceptor right-of-way's and cross-country lines in 2019.

The District contracted with Freese & Nichols and Hydro Structures to install flow meters and perform condition assessment of District assets. Hydro-Structures performed a manhole inspection of Manhole K-248 in Basin K and pipe condition assessments throughout Basin K. The flow meters were used to calculate the estimated inflow and infiltration during rain events. The locations of the flow meters are

- Smith Church Rd. Manhole K-192
- Vine St. Manhole K-1
- Virginia Ave. Manhole K-105
- Carolina Ave. Manhole K-142
- West 5<sup>th</sup> St. & Monroe St. Manhole C-160.



RRSD entered into *Task Authorization 3* associated with its Master Agreement with Freese and Nichols to perform Wastewater Sub-Basin 'K' Sanitary Sewer Evaluation Survey (SSES) to assist RRSD in identifying areas within the sub-basin where inflow & infiltration (I/I) is entering the collection system. Sub-Basin 'K' contains mostly 8" and 10" gravity collection lines with a 30" main interceptor (Chockoyotte Outfall) that runs through the basin. The sub-basin contains approximately 435 manholes, and approximately 100,000 feet of gravity pipe.

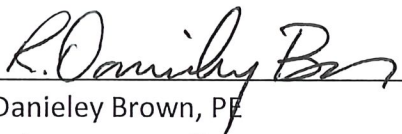
2. WWTP: All repairs to minimize the Inflow & Infiltration due to heavy rains are being made to correct known system deficiencies.

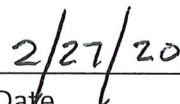
III. Notification:

This System Annual Performance Report will be available to customers via the Roanoke Rapids Sanitary District's Webpage at [www.rrsd.org](http://www.rrsd.org).

IV. Certification:

I certify, under penalty of law, that this document is complete and accurate to the best of my knowledge. I further certify that this report has been made available to the users of the named system and those users have been notified of its availability.

  
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R. Danieleley Brown, PE  
Chief Executive Officer

  
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Date