Annual Report for Wastewater Treatment Works / Wastewater Collection System
Fiscal Year 2019-20

I. General Information

Name of regulated entity:

Town of Carolina Beach

Responsible entity, person, or contact with phone number & address:

Name: William J. Raymond
Title: Wastewater Treatment Superintendent
Address: 404 S. Dow Road, Carolina Beach, NC
Phone: (910) 458-2976

Listing of applicable permits:

NPDES NC0023256 (ORC: William J. Raymond)
WWC WQCS00076 (ORC: William J. Raymond)

Description of collection or treatment process:

The Town of Carolina Beach has fifteen lift stations in the collection system, 30 miles of 10" & 8" gravity sewer lines, 5 miles of force main lines, and a wastewater treatment facility that is permitted to discharge treated effluent into the Cape Fear River per NPDES Permit #NC0023256. The WWTP has a permitted flow of 3.0 million gallons per day (MGD) and consists of a mechanical bar screen, manual bar screen, mechanical grit removal, influent and effluent flow recorder & samplers, three extended aeration basins, dual clarifiers, aerobic digestion / dual sludge storage basins, dual equalization basins, three traveling bridge tertiary filters, gas chlorination / dechlorination system, chlorination / dechlorination contact chamber, dual outfall pipes, and dual emergency generators. The facility also produces residual biosolids from the treatment process that are land applied on permitted agricultural sites. The Town of Carolina Beach used Lewis Farms and Liquid Waste for all contract residual biosolids land applications during the 2020 fiscal year. The Town of Carolina Beach submitted the required Biosolids Annual Report for 2019 to the U.S. Environmental Protection Agency and the N.C. Department of Environmental Quality during the 2020 fiscal year. The town reported that a total of 1,020,000 gallons (167.43 dry metric tons) of biosolids were land applied from the WWTP during the 2019 calendar year.

II. Performance

Text Summary System Performance for the 2020 fiscal year (beginning July 1, 2019):

The Town of Carolina Beach wastewater facility treated 348,778,000 gallons of wastewater during the 2020 fiscal year. The daily average flow treated during the 2020 fiscal year was 0.953 MGD, or 31.8% of the 3.0 MGD treatment capacity. The Town of Carolina Beach submitted a renewal application of NPDES Permit #NC0023256 in 2019. A new permit has not been issued yet; therefore, the requirements of the permit that expired on 5/31/2019 still apply. An annual effluent pollutant scan of 109 parameters is required three times during the five year permit cycle. No annual effluent pollutant scans were required during the 2020 fiscal year.

A compliance inspection of the Carolina Beach Collection System was conducted on 12/4/2019 by the N.C. Division of Water Resources (DWR). DWR reported that the facility is operating in compliance with the conditions and limitations specified in Permit # WQCS00076.

A compliance inspection of the Carolina Beach WWTP was conducted on 6/17/2020 by the N.C. Division of Water Resources (DWR). DWR reported that the facility is operating in compliance with the conditions and limitations specified in NPDES Permit # NC0023256.

Smoke testing was conducted in the sewer collection system that flows to Lift Stations #3 in the north end of Carolina Beach during the week of 3/16/2020. This is a problematic area during high precipitation events and extreme high tides that causes increased sewer flows from inflow and infiltration. A total of 28 defects were found in the smoke test area. The town is correcting these defects.

List (by month) of the number and type of any violations of permit conditions, environmental regulations or environmental laws (i.e. date, type, permit limit violations, monitoring and reporting violations, (illegal) bypass of treatment facilities, sanitary sewer overflows and estimated total monthly volumes and locations of events in which more than 1000 gallons of waste reached surface waters), and describe corrective actions taken:

Permit Limit Violations

There was one reportable permit limit violation during the 2020 fiscal year:

- The initial Effluent Grab sample on 12/13/2019 measured 900 µg/L for Total Residual Chlorine. The daily maximum permit limitation for the Effluent is 13 µg/L. The gas feed systems were found to be operating correctly; therefore, we determined that the sulfur dioxide feed rate was too low for a particular flow rate fluctuation. Sulfur dioxide is used to dechlorinate the Effluent for discharge.

Staff adjusted the sulfur dioxide rate to be in closer proportion to the chlorine feed rate and another Effluent sample was collected and found to be within acceptable permit limits. Due to the initial high reading, we determined it would take an extremely large amount of compliant samples to bring the daily average in compliance. The issue was discussed with DWR and the Division informed us that they feel the issue is corrected and sampling that many Effluent Grab samples in one day is unnecessary. However, they asked us to increase Effluent sampling to weekend/holiday sampling as well for the remainder of December. We complied with DWR instructions, and the Total Residual Chlorine remained compliant for the remainder of December.

Monitoring and Reporting Violations or Deficiencies

There were no reportable monitoring and reporting violations or deficiencies during the 2020 fiscal year.

Sanitary Sewer Overflows

There was one reportable sanitary sewer overflow (SSO) event during the 2020 year:

- An estimated 400 gallons of wastewater overflowed from a manhole at the WWTP on 404 S. Dow Road on 6/12/2020. The spill was contained and no wastewater reached surface waters. The SSO was caused by a temporary pipe blockage in a gravity line leading to the WWTP Equalization Basin during a flow spike due to heavy inflow/infiltration from precipitation. Town staff responded by cleaning the spill site.

  The SSO event was properly reported to the N.C. Division of Water Resources.

  There were no other SSO events during the 2020 fiscal year.

Any known environmental impact of violations:

There were no known environmental impacts from violations.

III. Notification

Statement as to how users or customers have been provided access to the report:

A public notice is placed in the local newspapers stating that copies of the annual report for the wastewater treatment plant and collection system are available upon request at the Town of Carolina Beach administration building. The report is also available on the town's website.

IV. Certification

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

Mark Meyer, Director of Public Utilities, Town of Carolina Beach
Permittee (Name of permittee, Title, Entity)

Signature of Permittee — Date 6/20/20

IMPORTANT DEFINITIONS

NPDES Permit – National Pollutant Discharge Elimination System Permit is the regulatory agency document issued by either a federal state agency designed to control all discharges of pollutants from point sources into U.S. waterways. NPDES permits regulate discharges into navigable waters from all point sources of pollution, including industries, municipal wastewater treatment plants, sanitary landfills; large agricultural feed lots and return irrigation flows.

Wastewater Collection (WWC) – The wastewater collection system is the permitted system of infrastructure (pump stations, force mains, gravity sewer lines) designed to convey wastewater to a wastewater treatment plant.

Operator in Responsible Charge (ORC) – The operator designated by the owner of the classified water pollution control system to be responsible for all operations of the system and to supervise all operators working in the system. The ORC must possess a valid certificate of the type and grade at least equivalent to the type and grade of the system.

Biochemical Oxygen Demand (BOD) – The rate at which organisms use the oxygen in water or wastewater while stabilizing decomposable matter serves as food for the bacteria and energy results from its oxidation. BOD measurements are used as a measure of the organic strength of wastewater.

Total Suspended Solids (TSS) – TSS are solids that either float on the surface or are suspended in water, wastewater, or other liquids.

Total Residual Chlorine (Tot. Cl_2) – This is the amount of chlorine remaining after a given contact time. It is also the sum of the combined available residual chlorine and the free available residual chlorine.

pH – A liquid measurement range of acidity or basicity scaled from 0 to 14, with 0 being the most acidic, 14 being the most basic, and 7 being neutral. Natural water usually has a pH between 6.5 and 8.5. NPDES permits in N.C. do not ask for average pH values because pH is measured on a logarithmic scale and arithmetic or geometric means do not apply to the data. This is the reason only monthly maximum and minimum pH values are reported.

Dissolved Oxygen (DO) – Molecular (atmospheric) oxygen dissolved in water and wastewater.

Toxicity – This is a bioassay method of determining toxic effects of industrial or other wastes by using live organisms such as fish for test organisms. The town is required to use chronic toxicity testing to demonstrate that the effluent discharge shall at no time exhibit observable inhibition of reproduction or significant mortality to *Mysidopsis bahia* (mysid shrimps) at an effluent concentration of 17.9%.

Enterococci (ENTERO.) – Enterococci are indicator bacteria found in the feces of warm-blooded animals. The switch from fecal coliform to enterococci testing requirements on our discharge permit is a result of EPA studies which indicate enterococci to have a greater correlation with swimming-associated gastrointestinal illness than fecal coliform.

Ammonia Nitrogen (NH_3-N) – Biological processes reduce NH_3-N concentration. Concentration of NH_3-N has permit limits because of its direct relation to fish toxicity.

Total Nitrogen, Total Phosphorus (TOTAL NITR., TOTAL PHOS.) - Nitrogen and phosphorus are important nutrients in the reproduction of microorganisms necessary for biological treatment of waste. However, the concentrations of these two nutrients are monitored because excessive amounts of these nutrients in an effluent can affect the oxygen demand in a receiving stream and cause algal blooms.

Total Copper (TOTAL CU) - The concentration of copper is monitored because the metal is a commonly found pollutant that has toxic effects on a receiving stream in excessive amounts.

Chlorodibromomethane (CDBM) – CDBM is a compound in the trihalomethane group that is considered an environmental pollutant in excessive concentrations. Trihalomethanes are formed as a by-product of chlorination.

Parts per million (ppm) or Milligrams per liter (mg/L) – one part per million corresponds to one minute in two years or a single penny in $10,000.

Parts per billion (ppb) or Micrograms per liter (µg/L) – one part per billion corresponds to one minute in 2,000 years or a single penny in $10,000,000.

Most probable number per 100 milliliters (MPN/100 mL) – These are the units designated to count the concentration of enterococci in a test sample.

PLANT PERFORMANCE FORM

Plant Name: Carolina Beach Wastewater Facility

YEAR 2019/ 2020	FLOW OUT (MGD)	BOD IN (ppm)	BOD OUT (ppm)	TSS IN (ppm)	TSS OUT (ppm)	Tot.CL2 OUT (ppb)	DO OUT (ppm)	Temp. OUT (°C)
NPDES PERMIT LIMITS	3.000	X X X	S / 5.0 W / 10.0	X X X	30.0	13	5.00	X X X
JUL.	1.065	247	3	223	0.3	20	6.96	29.6
AUG.	1.020	209	2	193	0.8	20	7.02	29.6
SEPT.	1.012	148	2	136	0.3	16	7.73	28.1
OCT.	0.751	149	3	132	0.7	16	8.30	25.8
NOV.	0.842	149	1	135	0.5	19	8.93	20.7
DEC.	0.740	181	0	151	0.0	18	9.01	18.0
JAN.	0.717	187	0	167	0.0	15	8.84	17.5
FEB.	0.885	206	1	153	0.8	16	8.77	17.3
MAR.	0.921	213	1	130	0.0	16	8.39	18.8
APR.	0.655	226	3	148	0.0	14	8.63	20.9
MAY	1.020	240	2	152	0.0	15	8.11	23.4
JUN.	1.821	243	1	152	0.0	19	7.04	26.3
YEARLY AVG.	0.953	200	2	156	0.3	17	8.11	23.0

Permit required sample frequency

Sample frequency - Daily: Tot. CL2, DO, pH, TEMP.
2x/Week: BOD, TSS, ENTERO., NH3-N
Monthly: TOTAL NITR., TOTAL PHOS., TOTAL CU
Quarterly: CHRONIC TOX., CDBM

* "S" represents the permitted summer months (April through October)
* "W" represents the permitted winter months (November through March)

NOTE: The N.C. Division of Water Resources considers all effluent total residual chlorine values reported below 50 ppb to be in compliance with the permit.

PLANT PERFORMANCE FORM

Plant Name: Carolina Beach Wastewater Facility

YEAR 2019/ 2020	pH OUT (UNITS)	ENTERO. OUT (MPN/ 100 mL)	NH3-N OUT (ppm)	TOTAL NITR. OUT (ppm)	TOTAL PHOS. OUT (ppm)	TOTAL CU OUT (ppb)	CDBM (ppb)	TOXICITY Mysidopsis bahia OUT
NPDES PERMIT LIMITS	6.8 / 8.5	35/100mL	S: 2.0 W: 4.0	X X X	X X X	21	X X X	PASS/ FAIL
JUL.	7.2 / 7.6	15	1.3	2.9	4.42	<10		
AUG.	6.9 / 7.2	20	0.5	3.5	4.07	<10	<1	PASS
SEP.	6.8 / 7.0	16	0.0	40.8	6.48	17		
OCT.	6.8 / 7.1	16	0.0	23.9	2.99	12		
NOV.	6.8 / 7.1	3	0.1	18.9	1.48	10	34	PASS
DEC.	6.8 / 7.0	2	0.0	24.0	2.84	12		
JAN.	6.8 / 6.9	1	0.0	23.4	3.12	<10		
FEB.	6.9 / 7.1	2	0.0	24.8	3.16	<10	33	PASS
MAR.	6.8 / 7.1	3	0.0	18.0	2.35	<10		
APR.	6.8 / 7.0	5	0.0	22.9	4.58	10		
MAY	6.8 / 7.1	2	0.0	24.1	3.11	<10	58	PASS
JUN.	6.9 / 7.1	2	0.0	40.0	4.16	12		
YEARLY AVG.	X X X	5	0.2	22.3	3.56	6	31	X X X

* "S" represents the permitted summer months (April through October)
* "W" represents the permitted winter months (November through March)