We are pleased to present to you this year's Wastewater Performance Report. This report includes a description for the Sewer Collection System and the Wastewater Treatment Plant as well as system performance, system upgrades, permit violations and public education information. This report covers the used water that leaves your residence or business and the process that it goes through during the treatment system.

If you have any questions about this report or concerning your water, please contact Josh O’Brien at 252-473-2133. We want our valued customers to be informed about their water and sewer utility. If you want to learn more, please attend any of our regularly scheduled meetings. They are held at 407 Budleigh Street. Meeting information is listed on our website.

Sewer Collection System Description

The Town of Manteo’s sanitary sewer collection system connects your residence or business to the Town’s wastewater treatment system. Your connection discharges into the maze of pipes underground that further connect to lift stations throughout the town. Lift stations help propel the wastewater to the Wastewater Treatment Plant where gravity flow is prevented. Utility contact and emergency response information is posted on signs located on the outside of each lift station. All of our lift stations are monitored by our SCADA system (Supervisory Control and Data Acquisition) which will notify us in case of an emergency.

Fats, Oils and Grease

Your connection to the collection system is a responsibility that continues to expand and grow. Regulatory requirements from the State of North Carolina Division of Water Resources mandates that municipalities take measures to reduce Sanitary Sewer Overflows (SSOs)--a violation of the EPA Clean Water Act. FOG discharged into public sewer systems is the leading cause of SSOs. Grease buildup occurs when Fats, Oils, and Grease produced from and aided in cooking end up in the sewer system. Whether you’re a Food Service Establishment, business or resident of the Town of Manteo who generates FOG, you play an important role in preventing Sanitary Sewer Overflows. Sanitary sewer systems are neither designed nor equipped to handle the FOG that accumulates on the interior of the municipal sewer collection system pipes. Over 30% of North Carolina’s 1999 sanitary sewer overflows were the result of pipe blockages from FOG accumulation from residential, institutional and commercial sources. The best way to manage FOG is to keep the material out of the plumbing systems.

FOG reduces the internal diameter of your sewer line. A four-inch sewer pipe can quickly become a two-inch pipe or smaller. Other debris grabs hold of the buildup which causes line clogs.
We have found that besides FOG, the number one cause of small line clogs comes from flushing wipes. Wipes do not dissolve. A gravity sewer line moves water at a slow pace and the velocity of the water does not carry enough force to transport wipes long distances. Wipes get left behind in your line and easily stick to internal surfaces of the pipes until a blockage occurs. The best practice is to dispose of wipes in the trash.

✓ **Scrape and collect** the grease into a waste container, and dispose of it in the trash/garbage.

✓ **Place food scraps** in waste containers or garbage bags for disposal with solid wastes.

✓ **Place a wastebasket** in bathrooms to dispose of solid wastes like disposable diapers and personal hygiene products.

✓ **Do not flush wipes.** Even wipes that say they are flushable do not dissolve and most likely will lead to a line clog.

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**Sewer Collection System Performance**

The Town of Manteo did not receive any violations for this compliance period.

SSO’s (Sanitary Sewer Overflows): Sanitary sewer overflows may result from a variety of causes: inflow and infiltration due to high water levels; blocked pipes from rags, roots, and grease accumulation; broken lines from corrosion or construction activity; power failures at pump and lift stations within the system.

*The Town of Manteo had no reportable SSO in this report period.*

**Sewer Collection System Upgrades**

**Capital Improvements:**

- Pump #2 replacement at Bowsertown Liftstation
- Replaced both check valves and both gate valves at Roanoke Village Liftstation

**Repair and Maintenance:**

- **Burnside Liftstation:** Preventive maintenance. No major repairs.
- Bowsertown Liftstation: Replaced #2 pump VFD
  Replaced upper guide rail section #2 pump
  Replaced level transducer
- Ballast Pt. Liftstation: Replaced pump station controller.
- East Hammock: Replaced PLC controller
  PM maintenance on generator
- West Hammock: Replaced control transformer
  Replaced solenoid priming valve and glass
  Replaced vacuum float assembly
- Roanoke Village Liftstation: (see capital improvements)
- Waterfront Liftstation: Preventive maintenance. No major repairs.
- Wingina Liftstation: Replaced steel wet well top with concrete wet well top
  Replaced suction flappers and wear plates
  Replaced both check valves
- Cedar Bay Liftstation: Preventive maintenance. No major repairs.
- Cypress Cove Liftstation: Replaced #1 pump
  Repaired discharge piping
- Peninsula Liftstation: Preventive maintenance. No major repairs.

Wastewater Treatment Plant Description

The Town of Manteo’s Wastewater Treatment Plant is a grade three activated sludge tertiary treatment facility treating wastewater from the Town’s sanitary sewer collection system. This plant treats wastewater utilizing preliminary screening and grit removal, secondary biological treatment and nutrient removal via an oxidation ditch and secondary clarifiers, tertiary effluent filtration and post aeration followed by chlorination disinfection and dechlorination prior to discharging effluent to Shallowbag bay.

Wastewater entering the plant is directed through a micro-strainer unit and grit removal system. The micro-strainer removes large and stringy objects from the wastewater flow that could damage downstream process equipment while also rinsing the screenings, returning organics to the waste stream. Wastewater then flows through a grit removal system that removes the inorganic solids (grit) which will not break down in the biological system while allowing the organic solids to continue through the treatment process.

Effluent wastewater from the grit removal system and drainage from various treatment processes are pumped by the influent pumps to the oxidation ditch where the concentration of organic matter and nitrogen are reduced during the extended aeration activated sludge process by the biological action of microorganisms. The organisms convert the organic matter into biomass and release nitrogen as gas. The oxidation ditch provides the oxygen needed by microbes in the system for biological oxidation of organic materials and for the conversion of ammonia to nitrate and the anoxic conditions needed for denitrification.

Effluent wastewater from the oxidation ditch flows to the final clarifiers which provide an undisturbed environment for the separation of solids from the water. After the solids settle in the clarifiers, the active solids are recycled to the oxidation ditch to maintain the microbe population at a level which promoted optimum removal of nutrients. Excess sludge is wasted from the system to the aerobic digester to maintain healthy levels of microbes in the treatment process.

Wastewater displaced from the final clarifiers flows by gravity to the effluent filters. Wastewater percolates down through the automatically backwashed filters to remove a major portion of the suspended solids in the water.

After water flows through the filters it flows into the chlorine contact tank. Sodium Hypochlorite is added at the head of the tank. The wastewater is dechlorinated at the tail end of the tank by the addition of Sodium Bisulfite. Effluent flows from the contact chamber to the post aeration structure where the water is subjected to the action of a floating aerator to bring the dissolved oxygen concentration to appropriate levels before it is pumped via a force main to Shallowbag Bay for dispersal.
Wastewater Treatment Plant Upgrades

During the time period of this report, the following items were completed:

**Capital Improvements:**
- Replaced both impellers and both wear plates influent pumps
- Replaced grit removal pump
- Replaced Supervisory Control and Data Acquisition (SCADA) server and created an additional operator workstation

**Repair and Maintenance:**
- Replaced screw auger for microstrainer system
- PM maintenance on WWTP generator
- Oxidation ditch:
  - Replaced 1 bearing drive #4
  - Replaced flex coupling for #4 shafts
  - Replaced motor for #4 drive
- Replaced aerobic digester aerator motor
- Repaired filter bridge rails
- Replaced filter bridge unit #1 backwash pump
- Replaced filter #1 motor drive forward/reverse contactor
- Cleaned chlorine contact chamber
- Replaced post aeration aerator motor
- Replaced sludge holding lagoon mixer motor
- Annual tank cleaning for aerobic digester and sludge holding lagoon
- Contract removal of 346,500 gallons stabilized sludge
- Contract removal of 232,250 gallons stabilized sludge

Wastewater Treatment Plant Performance

The Wastewater Treatment Plant met 100% of the NPDES permit requirements for the time period of this report. All sample results averaged well under permit limits. No violations were issued within the time period of this report. No sanitary sewer overflows occurred (SSOs) over 1,000 gallons or any that reached surface waters during the period of this report.