



## City of Clinton: Wastewater Systems Annual Performance Report

January 2016 through December 2016

### I. General Information

Facility/System Name: City of Clinton Collection System and Norman H. Larkins  
Wastewater Publicly Owned Treatment Works

Responsible Entity: Jeff Vreugdenhil, Director Public Works and Utilities

Person(s) in Charge/Contact: Jeff Vreugdenhil, Director Public Works and Utilities  
Neil D. Carroll, Wastewater Treatment Manager  
Michael Christopher Medlin, Utilities Superintendent  
Lisa Osthues, Environmental Programs Manager

Applicable Permit(s): Collection System Permit      WQCS00079  
NPDES Discharge Permit      NC0020117  
Land Application Permit      WQ0002890

## II. Collection System and Treatment Process Description

### A. Collection System

The City of Clinton maintains approximately 91 miles of wastewater collection lines with 14 lift major stations, 61 simplex lift stations, 1613 manholes, and approximately 3,558 connections. The Collection System is staffed by ten (10) full time personnel, led by the City's state certified Utilities Superintendent and Operator in Responsible Charge. The Collection System staff is responsible for the routine required inspection, maintenance and cleaning, as well as repair and upgrading of the collection lines, manholes, connections and simplex lift stations.

The Collection System is permitted by the state, and must adhere to state permit requirements. The system's use is regulated by the City's Sewer Use Ordinance, Chapter 22, Article V. Sewers, of the City of Clinton Code of Ordinances. The ordinance includes provisions for domestic and industrial users, as well as restrictions and requirements for treating wastewater prior to disposal in the City's Collection System with devices such as grease traps, or sand filters.

### B. Wastewater Treatment Plant

The Collection System discharges to the Norman H. Larkins Wastewater Treatment Plant. The treatment plant is staffed by ten (10) full time employees: four (4) certified full time Wastewater Operators, a Certified Maintenance Technologist, an Environmental Programs Assistant / Backup Laboratory Analyst, a Certified Laboratory Analyst, the Chief Wastewater Operator, the Environmental Programs Manager / Laboratory Supervisor, and the Operator in Responsible Charge / Wastewater Treatment Manager. The Operator staff and the Utility Maintenance Tech are also responsible for the operation and maintenance of the City's fourteen (14) duplex lift stations.

The plant is permitted by the state to treat five (5) million gallons of wastewater per day by tertiary biological methods. Following mechanical separation of solids and biological treatment, the treated wastewater is filtered, disinfected, and received by the Williams Old Mill Branch which enters the Great Coharie Creek of the Cape Fear River Basin. Wasted biosolids are aerobically digested and recycled through a land application program which is managed per North Carolina and EPA regulations. The on-site Wastewater Laboratory monitors the incoming wastewater (influent), in-process water (intermediate) and biosolids (activated sludge), and outgoing water (effluent) and biosolids (aerobic sludge) routinely to ensure the treatment processes are successful and that the water and biosolids adhere to state and federal standards. Additionally, the City is a member of the Lower Cape Fear River Program, and up and downstream monitoring is conducted via this program on behalf of the City.

The Environmental Programs Manager administers a state approved Pretreatment Program, which is required for any POTW to accept wastewater from any significant industrial user. The goals of the Pretreatment Program are to protect the waters of the state by preventing pollutant pass-through of the treatment facility, prevent interference with the wastewater treatment process, promote beneficial use of treated biosolids, and to protect the worker and the public health. These goals are accomplished through a program of cooperation between the POTW and the industrial users in which the industries maintain wastewater treatment operations in situ to reduce the amount of pollution in the influent of the wastewater treatment facility. The POTW helps the industries maintain a state of compliance through the issuance of Industrial User Permits, enforcement response, regular communication and inspections and sampling.

### **III. Certifications**

#### **A. Collection System**

For the calendar year of 2016, the City of Clinton Collection System employees maintained existing certifications or earned the following:

- One staff member earned a National Association of Sewer Service Companies (NASSCO) certification.

#### **B. Wastewater Treatment**

For the calendar year of 2016, the City of Clinton Wastewater Treatment Plant employees maintained existing certifications or earned the following:

- Two staff members earned Biological Wastewater Operator Grade III Certifications.
- One staff member earned a Biological Wastewater Operator Grade I Certification and a Bacteriological Analysis of Drinking Water Certification.

#### **C. Laboratory**

For the calendar year of 2016, the City of Clinton Wastewater Treatment Plant Laboratory successfully passed all annual proficiency testing, and maintained certification for thirteen (13) pollutant test methods. The WWTP Laboratory was recognized by Environmental Research Associates during the 2016 calendar year as a Laboratory of Excellence for achieving 100% acceptable data in proficiency testing.

#### IV. System Maintenance and Improvements

##### A. Collection System

During the 2016 calendar year, Collection System personnel performed routine cleaning of 64,267 ft. of collection lines. The crew has continued to utilize a camera system which allows for better assessment of conditions within the Collection System. In addition to routine maintenance the following repairs and/or upgrades were made to the system in 2016:

Collection System Repairs/Upgrades in 2016
307 Feet of Collection lines replaced
314 Feet of slip lining added
3 Manhole rings and covers replaced
16 New cleanouts installed
8 New connections added
Camera assessment of over 3000 feet of Collection System main performed
Fox Lake Lift Station: repaired pump
Carter St. Lift Station: repaired pump motor, installed new MTDPC controller, installed new auto dialer
Fontana St. Lift Station: installed new auger motor
Southeast Blvd. Lift Station: pulled pump and cleared debris, rebuilt pump motor, replaced controller
Ellis St. Lift Station: installed new auto dialer

##### B. Wastewater Treatment Plant

During the calendar year of 2016, in addition to routine maintenance of the plant and effluent outfall receiving waterways, the following major repairs, replacements or upgrades were made to the WWTP:

Wastewater Treatment Plant Repairs/Upgrades in 2016
New automatic SO <sub>2</sub> switchover system to replace failed system
Rebuilt Jet Aeration Basin Pump
Rebuilt Return Sludge Pump #3 and replaced impeller
New mixer motor in lime tower
Emptied and cleaned Aerated Grit Chamber and welded on a new deflector
Installed new drives for Influent and Intermediate flows
New rods and turnbuckles on the Trickling Filter
Complete refit and refurbishment of Primary Clarifier B with new gear box, new pipe, and new protective coating for concrete containment wall.
Pulled all 3 Influent pumps, the mud well pump, and boiler room motors to dry and replaced bearings, installed a new 600 amp panel and transformer for the Return Sludge building, and repaired effluent sampler after Hurricane Matthew.
Replaced and calibrated Jet Aeration Basin pH and Dissolved Oxygen probes

## V. Performance: Summary of Performance for Reporting Period

### A. Collection System Performance

The City's state issued Collection Systems permit (WQCS00079) was renewed in 2015, and remains effective through October 31, 2023. The City of Clinton Collection Systems underwent routine annual inspection by the North Carolina Department of Environment and Natural Resources (NCDENR) on May 24, 2016, and was found to be compliant with permit requirements.

The City of Clinton is routinely working to maintain and improve the efficiency of our Collection System by increasing routine maintenance of lines and lift stations and participating in an ongoing education program in which citizens are instructed in the importance of proper disposal of household waste, including fats, oils, and grease. The City is encouraging its citizens and system users to recycle used cooking oil, avoid the use of 'flushable' wipes, and limit garbage disposal usage, in particular. Flyers were distributed to areas throughout the City in 2016, and City staff participated in additional public outreach opportunities such as the Sampson County Business Expo and Alive After Five concert events.

#### A Summary of Sanitary Sewer Overflows (SSOs) follows:

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. These events were reported to the North Carolina Department of Environmental Quality (NCDEQ) as required.

*February 20 and 22, 2016*

*Two spills occurred two days apart due to equipment failure at Fox Lake Lift Station. The first spill estimated to be 700 gallons occurred on February 20<sup>th</sup> from manhole #1060 due to a failed pump capacitor at Fox Lake Lift Station. An estimated 700 gallons entered the surface waters of Great Coharie Creek at Blackmans Pond through an adjacent storm drain. On February 22<sup>nd</sup> a second capacitor failed, causing a second spill estimated to be 600 gallons which entered surface waters. Following this second incident, it was determined that a bad float switch was causing the pump to turn on and off repeatedly, overworking the capacitor and causing it to fail. The City of Clinton received a Notice of Violation from the NC Division of Water Resources for the incidents.*

*October 8-10, 2016*

*A spill estimated to be 200 gallons from manhole # 1060 occurred due to loss of power to Fox Lake Lift Station as a result of torrential rains and high winds associated with Hurricane Matthew. All 200 gallons entered the surface waters of Great Coharie Creek at Blackmans Pond through an adjacent storm drain. It is not known at this time if the receiving stream suffered any effects from this incident.*

**B. Wastewater Treatment Plant Performance**

During the calendar year of 2016, the City of Clinton Norman H. Larkins WWTP treated approximately 1.05 billion gallons of wastewater. The plant and its associated laboratory facility underwent routine inspection by the North Carolina Department of Environmental Quality (NCDEQ) for the calendar year of 2016. Both were found to be in compliance with state and federal regulations.

The following table summarizes plant performance for the calendar year 2016 in comparison with Nation Pollutant Discharge Elimination System (NPDES) permitted limits:

**NORMAN H. LARKINS WASTEWATER TREATMENT PLANT EFFLUENT ANALYSIS**

Parameter	Limit Interval	Spring / Summer (April 1 to October 31)		Fall / Winter (Jan 1 to March 31 and November 1 to December 31)	
		NPDES Limits	Measured Values; Range or Mean	NPDES Limits	Measured Values; Range or Mean
<b>Flow</b>	Mean Monthly	5.0 MGD	<b>2.7 MGD</b>	5.0 MGD	<b>3.2 MGD</b>
<b>pH</b>	Daily	6.0 to 9.0 S.U.	<b>6.4 to 7.9 S.U.</b>	6.0 to 9.0 S.U.	<b>6.9 to 7.7 S.U.</b>
<b>Residual Chlorine</b>	Daily Maximum	17.0/50.0 µg/L	<b>49.7 µg/L</b>	17.0/50.0 µg/L	<b>36.3 µg/L</b>
<b>BOD<sub>5</sub></b>	Mean Monthly	5.0 mg/L	<b>3.27 mg/L</b>	10.0 mg/L	<b>5.12 mg/L</b>
<b>Ammonia Nitrogen</b>	Mean Monthly	1.0 mg/L	<b>&lt;1.0 mg/L</b>	2.0 mg/L	<b>&lt;1.0 mg/L</b>
<b>Total Suspended Residue</b>	Mean Monthly	30.0 mg/L	<b>5.0 mg/L</b>	30.0 mg/L	<b>12.3 mg/L</b>
<b>Fecal Coliform</b>	Geometric Mean Monthly	200 cfu/ 100 mL	<b>82.9 cfu/100 mL</b>	200 cfu/ 100 mL	<b>18.7 cfu/100 mL</b>
<b>Dissolved Oxygen</b>	Daily Minimum	6.0 mg/L min.	<b>6.0 to 8.8 mg/L</b>	6.0 mg/L min.	<b>6.0 to 9.8 mg/L</b>
<b>Temperature</b>	Daily	Monitor	<b>20.5 to 32.7°C</b>	Monitor	<b>15.2 to 26.5 °C</b>
<b>Conductivity</b>	Daily	Monitor	<b>1301 µmhos/cm</b>	Monitor	<b>1131 µmhos/cm</b>
<b>Total Cyanide</b>	Quarterly	Monitor	<b>&lt; 5 µg/L</b>	Monitor	<b>&lt;5 µg/L</b>
<b>Total Nitrogen</b>	Monthly	Monitor	<b>27.6 mg/L</b>	Monitor	<b>16.2 mg/L</b>
<b>Total Phosphorus</b>	Monthly	Monitor	<b>19.1 mg/L</b>	Monitor	<b>8.2 mg/L</b>
<b>Total Copper</b>	Quarterly	Monitor	<b>12.0 µg/L</b>	Monitor	<b>3 µg/L</b>
<b>Total Zinc</b>	Quarterly	Monitor	<b>44 µg/L</b>	Monitor	<b>3 µg/L</b>
<b>Total Mercury(LL)</b>	Quarterly	Monitor	<b>1.51 ng/L</b>	Monitor	<b>0.97 ng/L</b>
<b>Total Lead</b>	Monthly	Monitor	<b>&lt;10 µg/L</b>	Monitor	<b>&lt;10 µg/L</b>

The Norman H. Larkins Wastewater Treatment Plant had ten (10) non-compliance events for the 2016 reporting period; two (2) spills and eight (8) exceedances. These events were reported to the North Carolina Department of Environmental

Quality (NCDEQ) as required. The POTW received two (2) notices of violations for the non-compliance events. No civil penalty was issued to the POTW.

<p><i>Month of February 2016: The City of Clinton WWTP received extremely high volumes of rain in February 2016. A total of 8.3 recorded inches fell for the 29 days of Feb, with 4.0 inches of that being received in the first week of the month alone. The second week of the month, we received 2 additional inches, and the third and fourth weeks saw 1.3 and 1.1 inches, respectively. Due to the high volume and the rapid onset of the rain, the heavy precipitation caused filters to become overburdened, sending excess suspended solids into the effluent. Operators and staff took additional steps and made every reasonable effort to hold back solids, but due to circumstances that were beyond our control, they were unable to do so. Waste treatment staff were unable to contain TSS within the permitted limit for the first two weeks of the month, and also thereby, exceeded the monthly average limit.</i></p>
<p><i>Week of May 2<sup>nd</sup> – 6<sup>th</sup> 2016: Due to unknown causes, the weekly geometric mean limit for fecal coliform was exceeded.</i></p>
<p><i>May 5, 2016: A spill of approximately 400 gallons of wastewater occurred due to heavy rains, wind, and hail filling treatment units faster than water could flow through the system. Wastewater treatment plant personnel promptly responded with all available remedies. Despite these efforts, approximately 75 gallons entered the storm drain which flows to the Williams Old Mill Branch. Samples were taken during this event and the spill was reported to NCDEQ DWR as required. At this time, there is no known adverse effect to the receiving stream.</i></p>
<p><i>Week of July 5<sup>th</sup> – 9<sup>th</sup> 2016: The POTW experienced an excessive amount of rain during the second week in July and the fecal coliform geometric mean limit for the week was exceeded.</i></p>
<p><i>Month of August 2016: During the month of August, 2016, the Clinton WWTP experienced high fecal coliform values. Testing and operations were not able to fully reveal the cause of the increased coliform values. The monthly geometric mean limit for fecal coliforms was exceeded.</i></p>
<p><i>Week of September 11<sup>th</sup> – 15<sup>th</sup> 2016: The City was non-compliant for ammonia nitrogen for the week of September 11<sup>th</sup>. This was due to an SIU, Smithfield Clinton, exceeding their own permit parameters and sending a slug of BOD and TSS to our plant over a 24-hour period. The slug overloaded our facility, and resulted in treatment loss. Smithfield Clinton has been assigned written violations for exceeding TSS, BOD during that week. The root cause was identified, and the industry has returned to compliance.</i></p>
<p><i>October 8-10, 2016: Due to Hurricane Matthew, beginning at 8:00 PM October 8th, an uncontrolled discharge of approximately 8.3 million gallons of untreated and partially treated wastewater and rainwater occurred from the influent and intermediate portions of the wastewater treatment plant and entered the surface waters of Williams Old Mill Branch. The discharge resulted from torrential rains and flooding, leading to power loss as well as extensive damage to controls and equipment. Wastewater treatment personnel responded with every available remedy. The majority of the discharge consisted of rainwater from inflow and infiltration, but a portion of the discharge consisted of domestic and industrial wastewater. Effects to the receiving stream are unknown at this time. Due to the severe weather, the POTW exceeded the monthly BOD average requirement and the weekly limits for average BOD and fecal coliform geometric mean.</i></p>

**V. Notification**

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[http://www.cityofclintonnc.com/document\\_center/index.php#revize\\_document\\_center\\_rz104](http://www.cityofclintonnc.com/document_center/index.php#revize_document_center_rz104)

Paper copies may be obtained by visiting the City of Clinton Public Works Department, at 200 John Street, Clinton, NC, Monday-Friday, 7:00 AM to 3:30 PM, or by calling (910)299-4912.

**VI. Certification**

This report was certified on February 20, 2017 by Mr. Jeff Vreugdenhil, Director of Public Works and Utilities, Mr. Neil Carroll, Wastewater Treatment Manager, and Mr. Michael Christopher Medlin, Utilities Superintendent. Signatures are on file at the Clinton City offices, and may be viewed upon request.